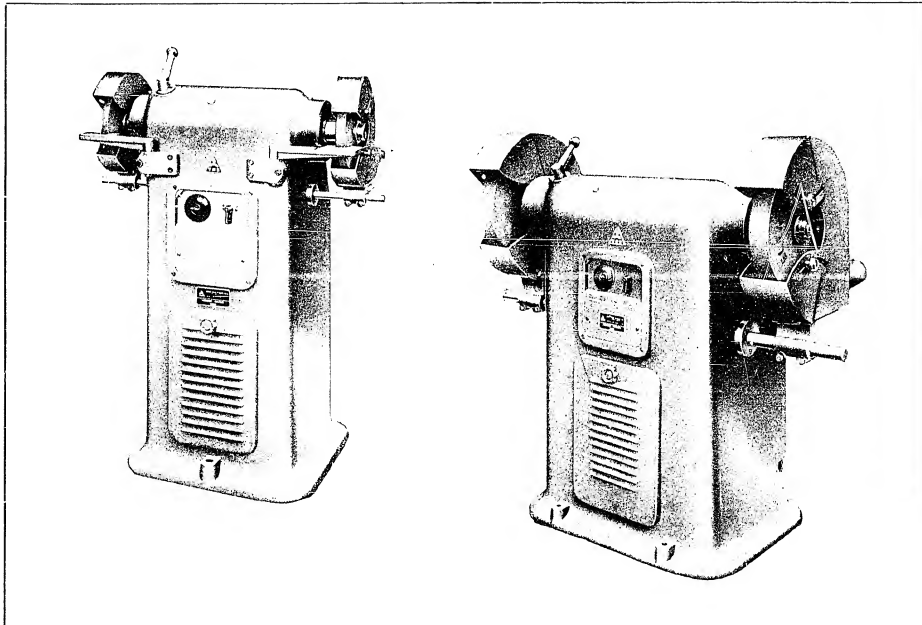


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DUPLEX - WHEEL GRINDERS BL3 - BL4

These machines are adapted for the grinding of seams, castings and forgings, and for the sharpening of cutting tools, chisels, etc. They can also be employed as polishing machines.

THE SPINDLE rotates in special ball bearings. The power is transmitted by V-belts from the electric motor located on a hinged plate inside the column. Both spindle ends are equipped with metric tapers for clamping the spindle extensions with the grinding wheels. The bearings are protected by labyrinth packings against the entrance of dust and dirt.

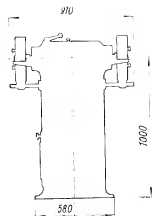
A powerful braking mechanism ensures instantaneous stopping of spindle. The grinding wheels are covered by hinged protective hoods.

The machines are made in two sizes:

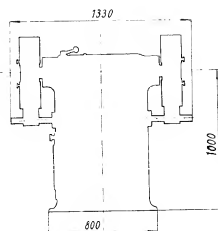
with grinding wheels up to dia. 225 mm for light work,
up to dia. 350 mm for heavy duty.



SPECIFICATIONS:



BL 3 Duplex-Wheel Grinder



BL 4 Duplex-Wheel Grinder

	Metric		English	
	BL 3	BL 4	BL 3	BL 4
Dimensions of grinding wheel: diameter	225	350	8 1/2"	13 1/2"
width	25	60	1"	2 1/4"
bore	25	33	1"	1 1/4"
	32	40		40
Taper in spindle	32	80	2 1/2"	3 1/2"
Diameter of grinding wheel flanges	740	1030	29"	40 1/2"
Distance between grinding wheels	2800	2710	2800	2710
Spindle speeds: for grinding	4100	4370	4100	4370
for polishing	2800	2800	2800	2800
Main drive motor: speed	3	4.5	3	4.5
output	550 x 950	700 x 1350	21 1/2" x 37 1/2"	27 1/2" x 53"
Floor space required	360	500	800 lbs	1100 lbs
Weight of machine with standard equipment	1	1.7	35 cu. ft.	60 cu. ft.
Contents boxed				

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

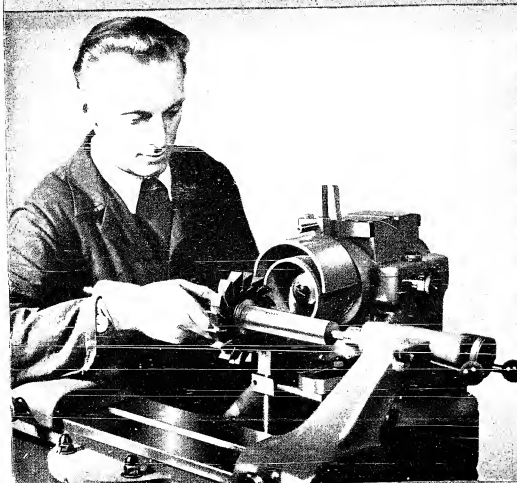
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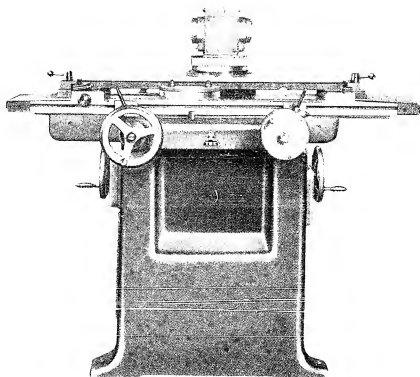
STAT

UNIVERSAL TOOL AND CUTTER GRINDER



102

102 UNIVERSAL TOOL AND CUTTER GRINDER



This machine, together with the supplementary accessories, has been designed and built for grinding a wide variety of cutting tools such as cylindrical and tapered reamers, face and side milling cutters with straight and spiral edges, backed-off cutters, milling heads, raps, counterbores and counter-sinks, and saws. It is furthermore suitable for grinding of twist drills, cylindrical grinding, internal grinding, the work being clamped either by means of the universal chuck, the magnetic plate or by collets with the possibility of clamping tools having Morse taper No. 0 or 1 in special clamping arbors. The wide range of the complementary equipment available considerably adds to the universal application of the machine, thus enabling it to meet demands laid on a modern tool room machine.

The machine proper:

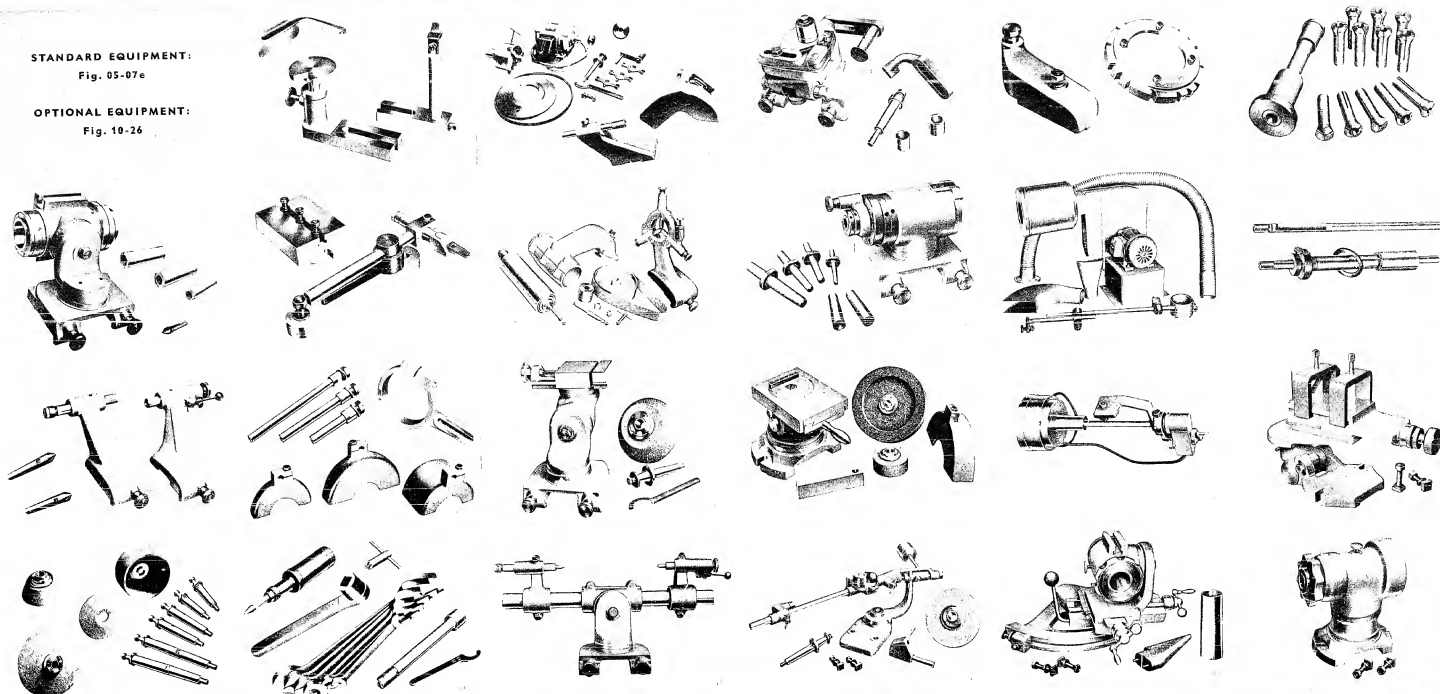
- a) THE WHEEL head, of the swivel type, can be vertically adjusted by hand wheels from both sides of the column. The spindle rotates in dust-proof precision bearings and is provided with 2 Morse tapers for receiving the grinding wheel mandrels. The spindle drive is by endless Texrope directly from the two-speed electric motor which is vertically adjustable on the column for belt tension.
- b) The cross slide carrying the work table is mounted directly on the V-guides of the bed. The cross hand feed is operated by hand wheels with micrometric dials. These handwheels are located at the front and at the rear of the machine. The guide-ways of the cross slide are adequately protected against the entrance of dirt.
- c) THE TABLE. Its lower part is mounted on the cross slide on precision roller chains, a feature which ensures easy and accurate longitudinal movement. The upper part is adjustable on dials for taper grinding. The rapid travel of the table is controlled by a crank while slow feed is actuated at the front over the differential. When the drive is disengaged the table can be easily moved by hand. The table travel is controlled by dogs functioning as movable or positive stops.

NORMAL ACCESSORIES:

- d) THE WORK head is arranged to swivel in horizontal and vertical plane. The amount of swivel can be read on the accurately graduated scales. The spindle head is graduated for setting the cutting angles. The spindle is fitted to receive metric taper No. 60 at the one and Morse taper No. 5 at the other end with the distinct possibility of altering the taper by means of reduction sleeves. To lock the wheel head on the table takes a minimum of time. The same applies to the clamping of the ancillary equipment. With a view enabling the grinding of larger diameters, the wheel head can be raised by means of the head block, thus bringing the height of centres from 130 mm (5") to 180 mm (7"). The spindle head is provided with slots on its both sides for clamping the tooth rests and various special attachments and fixtures.
- e) TAILSTOCKS. As these are in precision alignment with the working spindle axis, either both tailstocks or one tailstock combined with the working spindle can be used for clamping the workpiece. The centre sleeve of the left-hand tailstock is stationary, that of the right-hand tailstock movable. The pressure of the center upon the workpiece to be ground is controlled by spring.
- f) EQUIPMENT OF THE MACHINE: The machine is equipped with mandrels, grinding wheels and flanges, ejection arbor, with necessary spanners and pressure gun.

STANDARD EQUIPMENT:
Fig. 05-07e

OPTIONAL EQUIPMENT:
Fig. 10-26



STANDARD EQUIPMENT:

- 05 Workhead, reduction sleeve
- 06 Right-hand and left-hand tailstock
- 07a Mandrels, flanges and grinding wheels
- 07b Gauge, tooth-rest, support
- 07c Adjustable base plate, universal tooth-rest
- 07d Wheel guards and wheel guard holders
- 07 Spanners, pressure gun, ejector rod

SPECIAL EQUIPMENT:

- 10 Cylindrical grinding attachment
- 11 Internal grinding attachment
- 12 Vice for surface grinding attachment
- 13 Long reamer grinding attachment
- 14 Backed-off face mill sharpening device
- 15 Roughing reamer grinding attachment
- 16 Attachment for the grinding of carbide-tipped tools
- 17 Twist-drill grinding attachment
- 18 Dividing attachment
- 19 Dust exhausting attachment
- 20 Magnetic chuck
- 21 Milling cutter radius grinding attachment
- 23 Collet chuck attachment
- 24 Attachment for grinding small diameter tools with Morse taper
- 25 Radius grinding attachment for the grinding of cutting tools
- 26 Cutter head grinding attachment

SPECIAL EQUIPMENT:

- 10 The cylindrical grinding attachment enables grinding of cylindrical and tapered surface as well as faces of tools and small components of fixtures. Grinding is effected either between centres, center and chuck, or exclusively in the chuck. The cylindrical grinding attachment has an electric motor of its own, a chuck of 115 mm (4.5") dia., an arbor with flange and grinding wheel, a wheel dressing device, 3 carriers and spanner.
- 11 The internal grinding attachment supplements the cylindrical grinding attachment. It is supplied with a special spindle for internal grinding (A 20) of 70 mm (2.8") outside diameter and a 3-jaw workrest. Internal grinding is possible already from 15 mm (0.6") diameter upwards.
- 12 The vice for surface grinding attachment. Comprises the base plate, two swivel brackets and the vice. This attachment enables adjustment of the work to any position with regard to the grinding wheel. It is used to advantage for the grinding of turning and planing cutters, straight threading dies, gauges, etc. It is also possible to assemble the vice directly on the base plate, or to use bar vice bracket. Width of jaw is 100 mm (4"), depth 20 mm (0.8"), maximum span 50 mm (2"). It is provided with an arbor with inserts and a grinding wheel.
- 13 THE LONG REAMER GRINDING ATTACHMENT is intended for the clamping of long tools, e.g. reamers, which, on account of their length, cannot be accommodated between the tailstock centres. This attachment is available in two executions, of 400 (15.7") and 800 mm (31.5") length. In ordering the long reamer attachment, kindly indicate the desired length. The workpiece is clamped between two centres, of which one is spring operated.
- 14 BACKED-OFF FACE MILL SHARPENING DEVICE. Is used to advantage whenever the tool has to be set up very accurately against the grinding wheel so as to obtain correct tooth profile.
- 15 ROUGHING REAMER GRINDING ATTACHMENT. This attachment is specially adapted for backed-off grinding of reamers up to 50 mm (2") diameter. Reamers with taper shank are clamped in the attachment either directly in the Morse No. 3 taper or by means of reduction sleeves in case of a No. 1 or 2 taper. Small reamers may be clamped in four clamping arbors with taper hole 1, 30, there is the distinct possibility of clamping in holes 13 (0.5"), 16 (0.6"), 19 (0.7") and 22 mm (0.8"). The scale for the adjustment of the tool with regard to the diameter of the tool has been set to what practice has proven to be the most efficient angle, i.e. 60° for cutting edges and an angle of 6° for lips.
- 16 ATTACHMENT FOR THE GRINDING OF CARBIDE-TIPPED TOOLS. The tool is placed on the supports which, being linked to the base, can be adjusted to any position in respect of the grinding wheel. This attachment is supplied with flanges and grinding wheels for hard metals and a wheel dressing device.

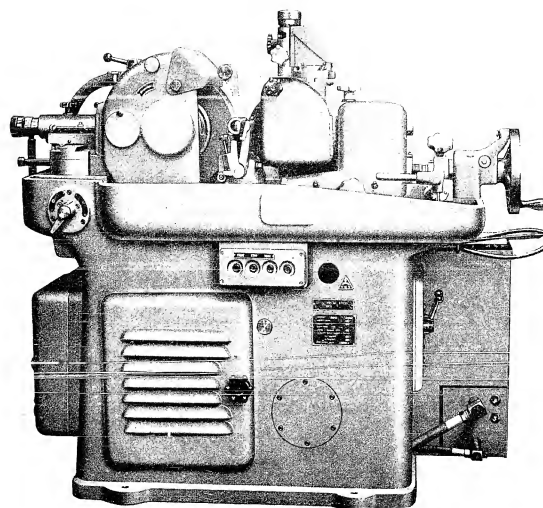
- 17 TWIST-DRILL GRINDING ATTACHMENT. Is intended for the grinding of twist-drills from 5 (0.2") to 25 mm (1"). Supplied with the attachment is a special arbor with flange, a grinding wheel and a wheel dressing device.
- 18 DIVIDING ATTACHMENT. Mounted on the working spindle, this attachment enables the division of the cutter periphery in the desired number of teeth. It is also used to advantage for the sharpening of cutters. Grinding wheels with division 2 (0.08"), 4 (0.16"), 6 (0.24"), 8 (0.31"), 12 (0.47") are supplied for use with the attachment. Further grinding wheels with division 5 (0.2"), 7 (0.28"), 9 (0.35"), 10 (0.39"), 11 (0.43"), 13 (0.51"), 14 (0.55"), 15 (0.59"), 16 (0.63"), 17 (0.67"), 18 (0.71"), 19 (0.75"), 20 (0.79"), 22 (0.87"), 24 (0.94"), 26 (1.0"), 32 (1.26"), 36 (1.42") and 60 (2.36"), 70 (2.76"), 80 (3.15") are delivered to customer's order and against extra charge.
- 19 THE DUST EXHAUSTING ATTACHMENT is equipped with a motor of its own as well as with a special holder so that the suction nozzle (in two different executions) can be adjusted to suit the particular profile of any grinding wheel used.
- 20 THE MAGNETIC CHUCK COMPLEMENTS the cylindrical grinding attachment. The magnetic chuck has a diameter of 150 mm (6"). On special request, this accessory is supplied with a rectifier assembled directly on the machine. Unless expressly specified otherwise, the magnetic chuck is supplied without rectifier.
- 22 MILLING CUTTER RADIUS GRINDING ATTACHMENT. This attachment is especially adapted for chamfering the edges of milling heads and for chamfering face milling cutters up to a 200 mm (12 in.) diameter.
- 23 COLLET CHUCK ATTACHMENT. Is intended for quick-gripping of small tools with shank tapers. Supplied as normal accessory is a 20 mm (0.8") diameter collet. Collets ranging from 6 mm (0.2") to 20 mm (0.8") diameter to customer's order and against extra charge.
- 24 ATTACHMENT FOR GRINDING SMALL DIAMETER TOOLS WITH MORSE TAPER NO. 0 AND 1. During grinding the table is secured in position by stops, the movement being confined to the bar and the tool within the limit set by means of the adjustment ring.
- 25 RADIUS GRINDING ATTACHMENT FOR THE GRINDING AND CUTTING TOOLS. This attachment has been designed for the chamfering of turning tools. The turning tool is clamped with the aid of fixings of which one is provided with an adjustable stop dog enabling quick-gripping of turning tools having the same diameter and radius.
- 26 CUTTER HEAD GRINDING ATTACHMENT. This attachment serves for the backed-off grinding of cutter heads up to 30 mm (1.17") in diameter which cannot be machined by means of the work head. The cutter head is specially adapted for the backed-off grinding of facing tool, profiling tool as well as for backed-off grinding of edges.

SPECIFICATIONS:

Swing over table	280 (11")
Swing over table (with raisings blocks)	370 (13")
Length between workhead and tailstock centers	500 (1'8")
Length between right and left-hand tailstock centers	690 (2'1")
Tailstock center above table	130 (5")
Tailstock center offset from rear table edge	55 (2.2")
Taper of workhead spindle	60
	Morse 5
Horiz. distance - center tailstock to center of wheel head: maximum	325 (1'1")
minimum	85 (3")
Vert. distance - center tailstock to center of wheel head: maximum	175 (7")
minimum	55 (2")
Standard dimensions of grinding wheel: external diameter	150 (6")
internal diameter	20 (0.8")
width	15 (0.6")
Maximum dimensions of grinding wheel: external diameter	200 (8")
internal diameter	32 (1.3")
width	20 (0.8")
Diameter of spindle for internal grinding	70 (2.8")
Diameter of jaw-chuck	115 (4.5")
Diameter of magnetic chuck	150 (6")
Workhead swivels horizontally and vertically	360°
Table swivels	90°
Fine swivel movement of table on a dial	350°
Swivel movement of grinding wheelhead	230 (9")
Vertical movement of grinding wheelhead	440 (1'5")
Longitudinal movement of table (by hand)	240 (9.5")
Cross movement of table (by hand)	920 x 140 (3' x 5.5")
Working surface of table	2800 ± 5600
Range of wheel spindle speeds	1400-2800
Motor of wheel spindle drive: Speed	0.7-1.2
Output	1485 1860
Floor space required	(4'10" x 6'1")
Weight of machine: with standard equipment	1000 (2200 lb.)
with packing	1065 (2343 lb.)
with seaworthy packing	1370 (3014 lb.)
Contents boxed	3.5 (124 cu. ft.)

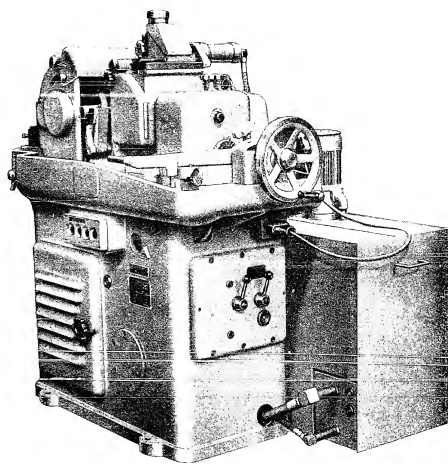
In ordering, specify voltage, phase and frequency of power supply!
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alterations without notice.

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TYPE BBZ 60 CENTERLESS GRINDING MACHINE

BBZ60



The Type BBZ 60 Centerless Grinding Machine

is intended for high precision grinding of cylindrical parts, straight as well as with shoulders, tapered parts as well as parts of various shapes. Straight cylindrical parts are machined by a method known as through-feed grinding, parts of other shapes by infeed-grinding.

On the machine, grinding can be done on parts made of steel, hardened as well as unhardened, brass, copper, aluminum, glass, plastics (e. g. fountain pens) and common mild steel. It is, of course, necessary to select a suitable grade of grinding wheel. The operation of the machine is very simple and no specially skilled person is required to set it up. The centerless grinding machine is very versatile in its application and the great variety of grinding work which can be done on it makes it one of the most useful machine tools.

Advantages of Centerless Grinding

- Particular high precision.
- High grade of surface finish.
- Output several times higher than that of center-type grinder.
- Saving in time; subsidiary operations such as centering and chucking are eliminated, cut is deeper.
- Deeper cut, yet pressure does not cause inaccuracy of shape.
- High degree of economy.
- Easy operation.

DESCRIPTION

The Wheel Head

The grinding wheel spindle runs in adjustable sleeve bearings and is driven by an electric motor by means of V-belts. The thrust is taken up by a double thrust ball bearing. The assembly is pressure lubricated by means of a centrifugal rim.

The Work Head

The hardened and ground regulating wheel spindle runs in adjustable sleeve bearings. It is driven by a chain through the gear box. Six speeds afford ample choice of a suitable speed. The maximum speed is used for tracing the wheel. The spindle is pressure lubricated by its own plunger pump.

The Base

which is made of cast iron, is of sturdy design and contains the electric motor, driving both wheels and the oil pump, and also the built-in panel of the electrical equipment consisting of the main fuses and the contactors for the main motor and the water pump motor.

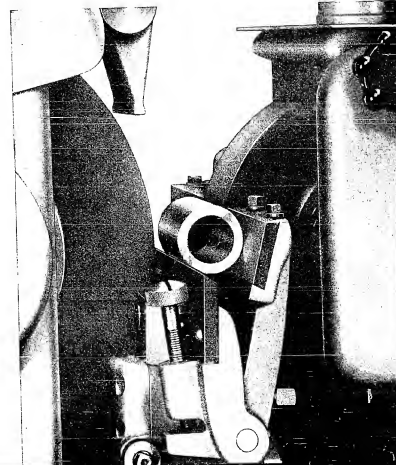
The Work-Rest

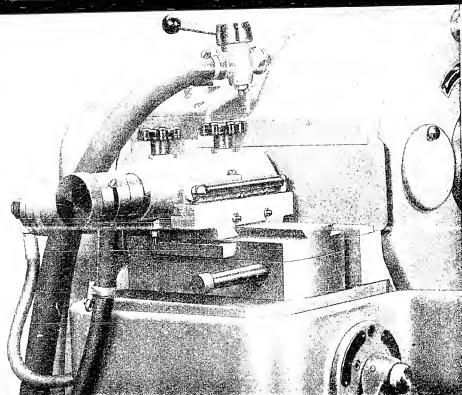
is fitted to the slide of the regulating wheel which is set at a distance corresponding to the diameter of the workpiece.

The work-rest carries the work-rest blade which guides the workpiece. The work-rest blade is interchangeable for various diameters and shapes of workpieces. The machine is equipped for infeed-grinding with a hydraulic ejector for the ejection of parts after grinding.

The regulating wheel is moved into and out of the cut by means of a hand lever.

Work-rest

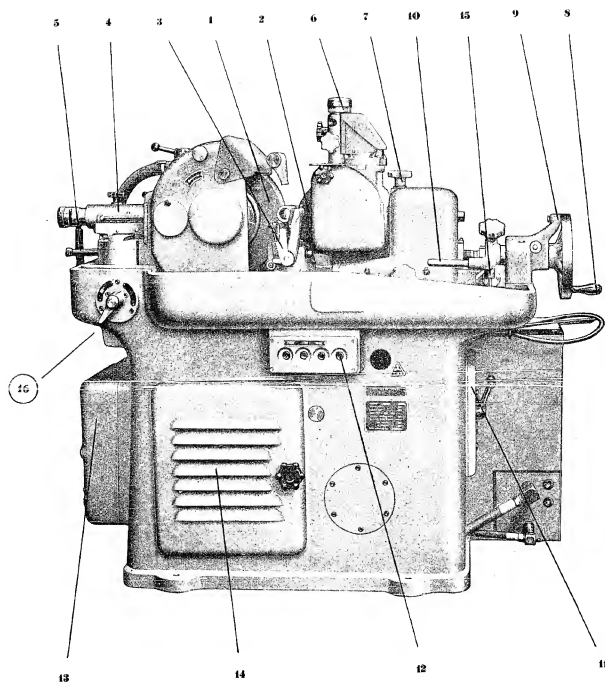
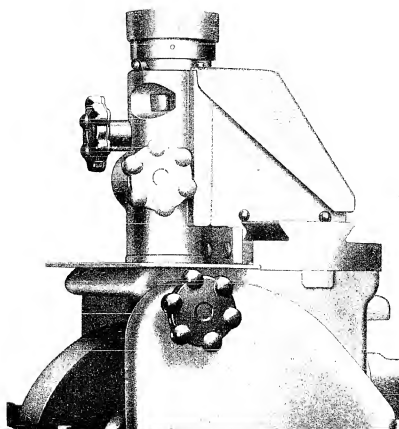




The Wheel Truing Device

Truing device of grinding wheel

Each wheel is equipped with its own wheel truing device. The devices are mounted on swivels. The hydraulic feed is hand controlled. For form grinding by the infeed method the wheel has to be given the negative shape of the part to be machined. For this purpose a special design of machine is available with a former plate. In case of through-feed grinding, care must be taken that the inclination of the regulating wheel truing device is the same as that of the regulating wheel. If this requirement is fulfilled a hyperboloidal shape of the regulating wheel is obtained and, as a result, a straight line contact with the workpiece.



Controls

1. Grinding wheel
2. Regulating wheel
3. Work-rest and work-rest blade
4. Grinding wheel truing device
5. Fine setting of truing device
6. Regulating wheel truing device
7. Regulating wheel inclination adjusting screw
8. Hand wheel for feed of regulating wheel
9. Adjustable zero indicator of hand wheel
10. Hand lever for infeed-grinding
11. Gear box of regulating wheel
12. Push-buttons of electric contactors
13. Main fuse, contactors
14. Pump of hydraulic system
15. Adjusting valve of hydraulic ejector for infeed-grinding
16. Adjusting valve of grinding wheel truing device

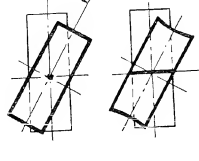
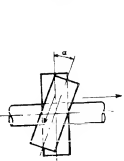
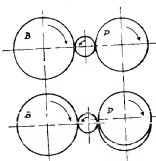
Centerless Grinding

is based on the following principles: When a cylindrical body is guided, between two rollers with parallel centerlines rotating in the same direction, in such a manner that its own center-line is also parallel, it receives a rotary movement around its own center-line without moving forward (Fig. 1). If, however, the wheel marked P is deflected from its vertical position and rotates, the part being ground moves forward between the two wheels. The wheel which remains in its vertical position is the grinding wheel and does the grinding proper while wheel P is the regulating wheel which causes the part being ground to move forward (Fig. 2). If the surface of regulating wheel P remained cylindrical a single-point contact with the workpiece would result. In order to obtain a straight line contact the surface of the regulating wheel has to be modified. This is done by the wheel truing device which has to be given the same inclination as the regulating wheel (Fig. 3). This gives the surface of the regulating wheel the shape of a hyperbolic with a straight-line contact with the workpiece. It is therefore always necessary to true the surface of the regulating wheel to correspond to the given rate of feed. The regulating wheel is inclined with a straight-line contact with the workpiece, the angle of inclination depending on the required rate of feed, of the workpiece (Fig. 3). For infeed grinding the regulating wheel remains permanently set at an angle of $1/2^\circ$ in order to press the workpiece against the stop.

Fig. 1

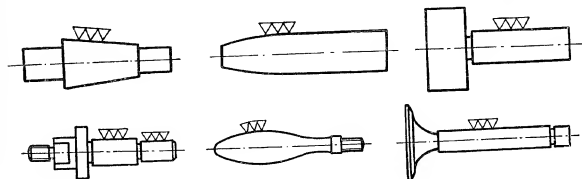
Fig. 2

Fig. 3



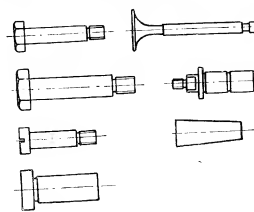
In the table below several examples of centerless grinding are shown, through-feed as well as infeed grinding with an indication of the diameters and lengths which can be machined on the type BBZ 60 centerless grinder.

Grinding method	Part	Equipment used	Length/Diameter mm inches
Through-feed Grinding		standard	3 dia — 60 dia/220
		special	1/8 dia — 3/4 dia/83 1/2
		special	1/16 dia — 1/2 dia/83 1/2
		special	3 dia — 10.5 dia/3000
		special	1/8 dia — 11/16 dia/118
Infeed Grinding		standard	3 dia — 60 dia/78
		special	1/8 dia — 2 1/2 dia/31 1/2



The economy of the type BBZ 60 centerless grinder in single-piece as well as in repetition work and its high output are obvious from the table below where examples of through-feed grinding as well as of infeed grinding are quoted with the approximate numbers of parts machined per minute.

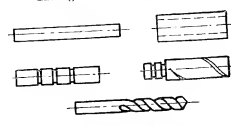
Infeed Grinding:



Shanks of Bolts

Diameter mm	inches	Pieces per min. approx.
3 to 8	1/8 to 5/16	8
10 to 12	3/8 to 1/2	5
14 to 20	1/2 to 3/4	4
24 to 36	1 to 1 1/2	3
39 to 45	1 1/2 to 1 3/4	2

Through-feed Grinding:



Pins 100 mm (4") long

Diameter mm	inches	Pieces per min. approx.
3 to 6	1/8 to 1/4	20
6 to 8	1/4 to 5/16	15
8 to 12	5/16 to 1/2	10
12 to 15	1/2 to 3/4	7
15 to 20	3/4 to 1	5
20 to 35	3/4 to 1 1/4	3
35 to 45	1 1/4 to 1 3/4	2

Twist Drills

Diameter mm	inches	Pieces per min. approx.
3	1/8	20
5	3/16	16
8	5/16	8
10	3/8	6
15	7/16	2

Standard Equipment

- Grinding wheel
- Regulating wheel
- Truing devices without diamond
- Work-rest blades for through-feed grinding, for diameters
- Work-rest blades for infeed-grinding, for diameters
- Centrifugal coolant pump
- Coolant tank
- Electric motor
- V-belts
- V-belts
- Set of spanners
- Roller chain CSN (Czechoslovak Standard)
- Balancing arbor
- Operating instructions.

300x80x140 mm	11 3/4" x 3 1/4" x 5 1/2"
200x80x75 mm	7 7/8" x 3 1/4" x 3"
3 to 12 mm, 12 to 60 mm	1/8" to 1/2", 1/2" to 2 1/16"
3 to 12 mm, 12 to 60 mm	1/8" to 1/2", 1/2" to 2 1/16"
7.5 kW — 220/380 Volt	1440 r. p. m.
4-13 x 8 x 1700 mm	
2-10 x 7 x 900 mm	
2-10 x 7 x 1320 mm	
1/8" — 138 links	
1	

Optional equipment

- Work-rest blade for diameters
- Work-rest blades for special shapes
- Former plates
- Bar-rests for grinding long bars:

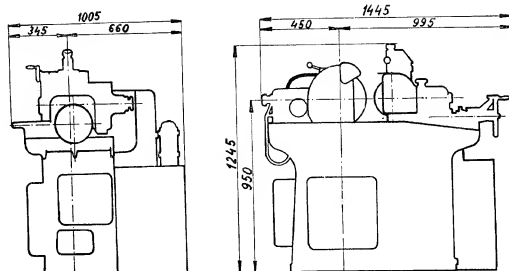
1.5 to 3 mm		1/16" to 3/8"
	on request	
	on request	
3 mm dia — 105/3000 mm		3/8" dia — 4 3/4"/118"
6 mm dia — 25/3000 mm		1/4" dia — 1 1/2"/118"
6 mm dia — 25/1200 mm		1/4" dia — 1 1/2"/47"

SPECIFICATION

Through-feed Grinding:

Workpieces ground with standard equipment:	3 to 60	1 1/2" to 2 1/2"
diameter mm	220	8 1/4"
maximum length mm		
Workpieces ground with optional equipment:	1.5 to 3	1 1/8" to 1 1/2"
diameter mm	220	8 3/4"
maximum length mm		
Infeed-Grinding:	3 to 60	1 1/2" to 2 1/2"
diameter of part mm	75	3"
maximum length mm		
Dimensions of grinding wheel:	300	11 1/4"
maximum diameter mm	80	3 1/8"
maximum width mm		
Dimensions of regulating wheel:	200	7 7/8"
maximum diameter mm	80	3 1/4"
maximum width mm		
Number of regulating wheel speeds	19 to 340	
Speed range of regulating wheel r.p.m.	1900	
Grinding wheel speed r.p.m.		
Motor of grinding and regulating wheels:	1440	
speed r.p.m.	10.2	
output HP		39 1/2 x 57"
Floor space required mm	1005x1445	
Weight of machine:		
net with standard equipment kg	1100	2430 lbs
shipping weight, ordinary packing kg	1250	2760 lbs
shipping weight, seaworthy packing kg	1350	3000 lbs
Volume of packing case cu. metres	4.4	156 cu. ft.
Measurements of packing case mm	1500x1800x1600	59" x 71" x 63"

PLEASE SPECIFY IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS
The machines are continuously being improved upon. The particulars given in this prospectus are therefore
not binding in detail.

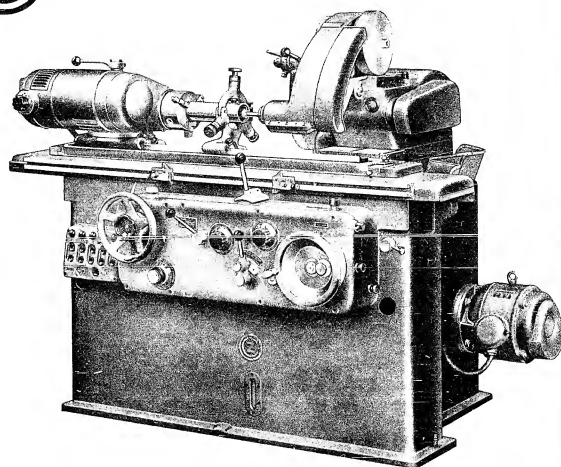


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STAT



ZBROJOVKA
UNIVERSAL HYDRAULIC
CYLINDRICAL
GRINDING MACHINES

BK3
BK5

BK3

BK5

These up-to-date machines are capable of grinding cylindrical surfaces between dead centres or in chuck. The swinging-frame internal grinding attachment enables holes to be ground.

OUTSTANDING FEATURES

Infinitely variable speed of hydraulically operated table traverse.

Adjustable time of stopping the table in reversals—Feed of grinding wheel in reversals—Plunge cut grinding—Rapid withdrawal and approach of grinding wheel—Single lever control—Wheelhead slide feed movement controlled by hand wheel and inch movement controlled by push-button.

Description

Bed is sturdy and well ribbed to provide stability under the heaviest cuts. The guideways for the table are protected from dirt and splash and lubricated automatically by rollers.

Table consists of two parts. The upper table swivels through 6 degrees. The amount of swivel can be read from a graduation. The table traverse is effected by hand and is automatic. The manual feed is either normal or fine. The speed of the automatic table feed is infinitely variable. The feed movement is quiet and the reversing of the table in reversals is smooth. The time of stopping the table in reversals is adjustable for length and can be selected to take place either in the right-, left-hand direction or in both reversals.

Wheelhead moves on slides which, in turn, are pivoted on the base. Backlash in the gear transmission is eliminated hydraulically.

The bearing surfaces are lubricated automatically by means of oil from a separate container.

Wheelhead can be traversed on the slide by means of gears. The spindle runs in adjustable plain bearings.

Lubrication is effected by an oil pump drawing oil from an integral container.

Both automatic and hand feed to the grinding wheel are provided. When setting up the machine or while a finishing cut is being effected an additional hand feed of 0.005 mm of the grinding wheel is obtainable through a special push-button.

The automatic feed takes place either in the reversal (the feed is dependent on the table movement) or while using the plunge cut grinding method (in this latter case the feed is independent of the table movement).

The feed can be selected to operate either in the left-hand, right-hand or in both reversals.

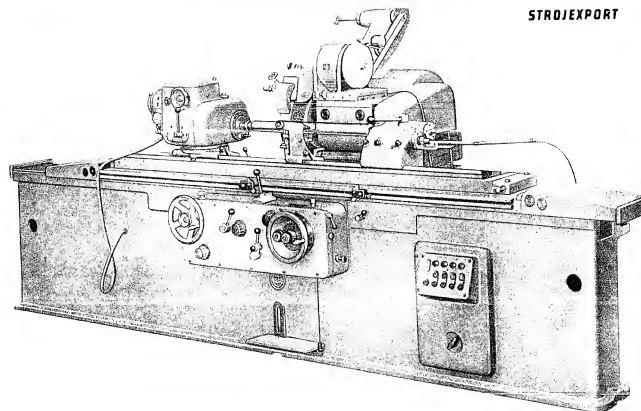
For each of the two modes of automatic feed of the grinding wheel the feed rate can be adjusted within a range of from 0.0025 to 0.0175 mm.

For the independent feed, in addition, the speed can be adjusted within 0.05 to 1.4 mm/min.

Rapid withdrawal of the grinding wheel from the work is effected by means of a hand lever.

The subsequent approach to the component being ground is held within the accuracy limits of ± 0.001 mm.

STROJEXPORT



Workhead is standard for both external and internal grinding operations and can be swivelled through 60 degrees. The spindle is mounted on adjustable plain bearings. An oil pump has been provided for lubrication.

Footstock. The Model BK 3 is equipped with a standard design, lever actuated footstock. The centre is held to the workpiece by means of a spring pressure. With the Model BK 5 the footstock is operated hydraulically by means of a foot lever.

Centrifugal coolant pump is firmly connected to the motor. The coolant container is situated outside the machine to provide easy access for cleaning purposes.

Motors are protected by contactors fitted with thermal overloads and controlled through push-buttons.

Operation of the machine is extremely simple, all controls are grouped on the control panel.

Standard equipment

2 Morse centres—a grinding wheel and balancing flange—a pulley and flange puller—an open steadyrest—a closed steadyrest—a diamond holder without diamond—a balancing mandrel—set of spanners—guards—motors to operate on 380 V, 50 c/s.—complete electrical equipment—a grease gun—and an operator's instruction handbook.



SPECIFICATION

	BK 3	BK 3	BK 3	BK 3
Height of centre	19.69"	29.53"	39.37"	59.06"
Maximum distance between centres	5.12"	5.12"	5.91"	5.91"
Maximum diameter swung	18.69"	29.53"	39.37"	59.06"
Grinding wheel (diameter X bore X width)	9.84"	9.84"	12.40"	12.40"
Work speeds	13.98" X 2.36" X 5.01"	13.98" X 2.36" X 5.01"	19.69" X 2.93" X 7.99"	19.69" X 2.93" X 7.99"
	50-750	50-750	25-30-60-95-150	25-30-60-95-150
			-240-380-600	-240-380-600
Table traverse	0.04"-0.32"	0.04"-0.32"	0.04"-0.24"	0.04"-0.24"
Minimum table traverse when operated hydraulically	0.12"	0.12"	0.12"	0.12"
Maximum traverse of table	29.59"	35.43"	46.07"	63.73"
Grinding wheel speed	1850	1850	1150	1150
Taper in work spindle	4 Morse	4 Morse	4 Morse	4 Morse
Taper in tool-lock	3 Morse	3 Morse	4 Morse	4 Morse
Swivel of table	6°	6°	90°	90°
Swivel of wheelhead	60°	60°	30°	30°
Swivel of wheelhead	30°	30°	30°	30°
Wheelhead slide traverse operated by hand wheel	3.34"	3.34"	5.52"	5.52"
Rapid traverse of wheelhead within	1.58"	1.58"	1.58"	1.58"
Traverse of wheelhead on slide	3.94"	3.94"	5.52"	5.52"
Automatic feed of grinding wheel in reversal	0.0002"-0.012"	0.0002"-0.012"	0.0002"-0.012"	0.0002"-0.012"
Independent automatic feed	0.002"-0.04"	0.002"-0.04"	0.002"-0.04"	0.002"-0.04"
Total power of motors	3.7	3.7	7.6	7.6
Weight approx.	4,630 lbs.	5,071 lbs.	7,607 lbs.	8,488 lbs.
Length of machine X height	75" X 51"	101" X 51"	122" X 55"	157" X 55"
Floor space required	98" X 59"	130" X 60"	142" X 63"	197" X 63"
Coarse feed of table per 1 rev. of hand wheel	1"	1"	1"	1"
Fine feed of table per 1 rev. of micrometric screw	0.04"	0.04"	0.04"	0.04"

Extra equipment

1. Swinging frame internal grinding attachment, fixed to the wheelhead, including internal grinding spindle and extension.
2. Further extensions.
3. Quick grip collet chuck attachment.
4. Collets from 3 to 16 mm diameter.
5. Stand for balancing grinding wheels.
6. Micrometric stop.
7. Three-jaw chuck and back plate.
8. Spot light.

When ordering, specify voltage, phase, and frequency of power supply!

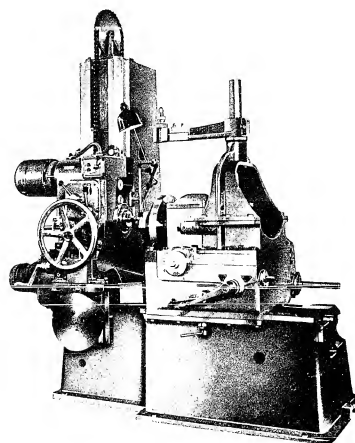
As we are constantly developing and improving the design of our machine we reserve the right to incorporate modifications when necessary and without notice.

STROJEXPORT
PRAHA — CZECHOSLOVAKIA

Universal Cam Milling Machine



STAT



is a Special Heavy Duty Machine designed for the milling of peripheral, face or cylindrical cams by mechanical copying from templates. Equally suitable for single part and mass production.

FEK
80

THE BED forms a rigid, wide and sturdy base for the machine, resisting distorting influences and forces set up during operation. The side walls are reinforced by diagonal ribs. The flat, wide guideways are accurately ground.

THE FEED BOX is attached to the left-hand side of the bed and driven by a self-contained flange mounted electric motor. The movement is transmitted from the box to the template spindle on the one hand and to the workhead drive box on the other.

THE TEMPLATE SPINDLE carrying a worm wheel runs in an eccentric bush which can be rotated within the range of 40° in order to eliminate the play between the worm and worm wheel. The eccentric bush is arranged in the left-hand part of the bed. Templates, the strokes of which are transmitted to the cam being ground at a ratio of 1:1, are fixed to the head of the spindle.

THE WORKHEAD DRIVE BOX is bolted to the rear of the slide. The rotary motion is transmitted from the drive box through spur gears, a dog coupling, a set of pulloid bevel gears and a worm to a worm wheel on the work spindle.

THE WORKHEAD. The workhead spindle has 8 rates of rotary feed which are engaged by 2 levers arranged at the top of the feed box cover. When the power feed is disengaged by the lever at the front of the slide the spindle may also be rotated by hand by means of a crank. The large indexing ring on the shaft of the crank is graduated in 5 minute divisions.

One revolution of the crank gives the spindle with the cam, which is being machined, a rotary movement of 5°. The spindle runs in Tinkens bearings, the play of which, if any, can easily be taken up.

The work spindle carries two clamping plates, one for working with the spindle in its horizontal position, i. e. for milling peripheral and face cams and the other for working with the spindle in its vertical position, i. e. for milling cylindrical cams. On their front surfaces both clamping plates are provided with T-slots arranged at a distance of 50 mm from each other. The workhead swivels on heavily dimensioned pins by operating a hand crank.

The divided worm wheel on the workhead spindle enables the play between the worm and worm wheel to be reduced to a minimum. The slide with the workhead is moved along the bed by a hand crank. The large indexing ring on the shaft of the crank is graduated in 0.05 mm (approximately 0.002") divisions and facilitates a correct setting of the milling depth. One revolution of the crank gives the slide a movement of 5 mm (0.2").

THE HEADSTOCK moves along the guideways arranged on the column and is balanced by a counter-weight (inside the column, suspended on a chain carried by a large pulley). The headstock is moved for adjustment by a large hand wheel and fixed to the required position by means of a folding adjusting pawl and ratchet. During the operation the pawl is disengaged and the headstock moved along the column mechanically in accordance with the rising and dropping shape of the rotating template. The headstock is driven by a self-contained flange motor. The spindle speeds are changed as per instruction plate located at front of the headstock. The milling spindle runs at its front in two Tinkens bearings and at the rear in a roller bearing.

To the bottom part of the headstock a steel welded bracket is bolted the guideways of which carry a cast iron bracket with the copying roller holder. The cast iron bracket is held in position by bolts inserted into T-slots. The copying roller runs on needle bearings revolving directly on the pin.

The roller is coarsely adjusted for height in relation to the template by moving the cast iron bracket up or down. The accurate adjustment is made and the depth of cut set by means of a crank, a pair of bevel gears and a screw. The indexing ring on the shaft of the crank has 0.02 mm (approximately 0.0008") divisions. One revolution of the crank alters the distance between the roller and the milling spindle by 3 mm (approximately 0.15").

The even-line of the roller is aligned with the engraved line on the template by a special setting bar. The roller with its holder can be moved sideways on the cast iron bracket, when the fixing bolts are loosened, by set screws at the sides of the roller holder.

The milling cutter can be adjusted for height in relation to the cam being ground with an accuracy of 0.1 mm (0.004") by reading the movement on a scale with a vernier and a magnifying glass arranged on the upper part of the headstock.

LUBRICATION. The feed box and the bearings of the gears in the bed are centrally lubricated by a piston oil pump driven by a cam in the feed box. The gears in the bed, drive box and headstock run in an oil bath. The slide, bed and column guides are lubricated by hand by a grease gun.

COOLING ATTACHMENT (supplied only on special order and at an extra charge). A coolant tank is formed at the rear of the bed. An electric motor-driven pump supplies the coolant through pipes with joints, a cock and a nozzle to the work. The used coolant and the chips are collected either in a separate vessel or in a two-part pan, depending on the position of the workhead spindle. In the overflow tank incorporated in the coolant tank inside the bed the chips are separated from the returning coolant.

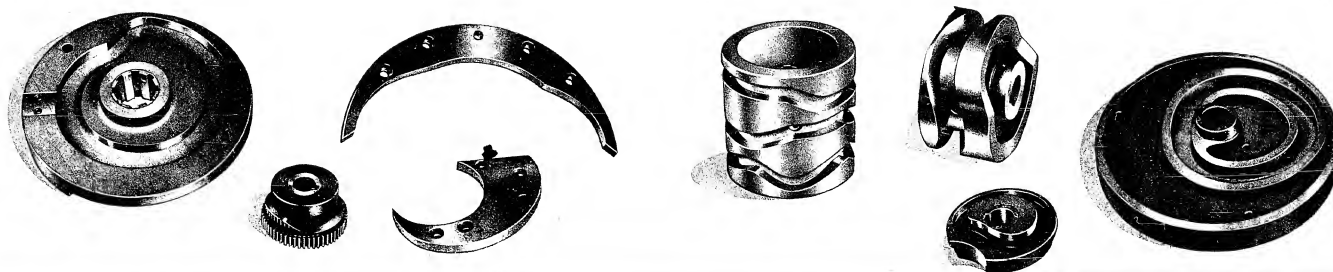
ELECTRICAL EQUIPMENT. The electrical equipment cabinet is suspended on the left hand side of the column. It includes, among other items, a switch for reversing the milling spindle rotation, a switch for the motor driven coolant pump and a light switch. The switches for the feed box and headstock motors are arranged at the top of the headstock within convenient reach of the operator.

We normally supply motors to suit three phase, 50 cycles, 380/220 Volts and electrical equipment for three phase 380 Volts designed to BSC standard specifications. In case the customer requires a machine with electrical equipment designed to a different system of electric power or in accordance with different standard specifications we can supply it at a charge for the difference in cost.

THE OPERATION OF THE MACHINE is simple and made easy by clear, conveniently arranged instruction plates.

STANDARD EQUIPMENT (supplied with the machine, the price being included in the price of the machine). Tools for the maintenance and operation of the machine—table for finished parts—1 Morse 4 Metr. 21 reducing sleeves—Morris 1 centre—clamping screw for the work spindle—1 clamping screws for the milling spindle—2 setting bars—cooling attachment—operating instructions.

OPTIONAL EQUIPMENT (supplied only on special order and at an extra charge). Column and adjustable supporting arm with holder and sleeve with centre (for heavier operations on large cams).



SPECIFICATIONS



PRINCIPAL DATA AND DIMENSIONS:

Milling capacity of the machine:	approx. mm	800	20"
peripheral and face cuts up to a diameter of	approx. mm	700	30"
cylindrical cuts up to a diameter of	approx. mm	300	12"
Maximum rise of machined lobe	approx. mm	450	20.6"
Maximum diameter of cam being milled with the workhead spindle in its vertical position and by using the supporting arm	approx. mm	1:1	55"
Ratio of template spindle speeds to headstock spindle speeds			
Maximum pitch angle of template	mm	506	20"
Distance, centre-line of template spindle to centre-line of workhead spindle in its horizontal position	mm	140	5 1/2"
Diameter of template spindle head	approx. mm	465	18 1/2"
Height of centre-line of template spindle above floor	mm	150 to 750	6" to 30"
Range of diameter of templates being used	mm	12 to 15	1/2" to 3/4"
Thickness of templates being used	mm	20	1 1/16"
Diameter of copying roller, standard	mm	510/0	20" 0
Maximum/minimum distance, end of milling spindle to front clamping plate with the workhead spindle in its horizontal position	mm	540/180	21 1/2"/7"
Maximum/minimum distance, end of milling spindle to centre-line of workhead in its vertical position	mm	400	16"
Width of bed-ways			
SLIDE AND WORKHEAD:			
Longitudinal travel of slide on bed	mm	5300	20' 10
Height of centre-line of workhead above bed-ways	mm	415	16 1/2"
Number of rates of rotary feed of workhead spindle		8	
Range of rates of rotary feed of workhead spindle		3.4 to 2.3 minutes	
1 revolution of workhead takes	Morse No.	5	1 1/2"
Taper in both ends of workhead spindle	mm	27.5	14"
Bore of workhead spindle	mm	350	
Diameter of clamping plates			
HEADSTOCK:			
Vertical travel of headstock on column	mm	600	24"
Number of milling spindle speeds in either direction	r. p. m.	100-1000	
Range of milling spindle speeds in either direction	Morse No.	4	
Taper in milling spindle			
DRIVE:			
Feed box motor, 500 r. p. m.	kW	0.7	
Headstock motor, 900 r. p. m.	kW	1.4	
Motor driven pump 2800 r. p. m., 20 litres per minute	kW	0.125	
DIMENSIONS AND WEIGHTS:			
Dimensions of machine	approx. mm	2250 x 1180 x 2385	90" x 47" x 91"
Net weight of machine with standard equipment and motors	approx. kg	2600	5700
Weight of feed box motor	approx. kg	25.5	56
Weight of headstock motor	approx. kg	43.5	95
Weight of motor driven pump	approx. kg	11	24
Weight of railway packing	approx. kg	210	462
Weight of seaworthy packing	approx. kg	390	858
Dimensions of railway packing	approx. cu. metres	236 x 130 x 240	90" x 50" x 50"
Contents boxed		6.5	cu. feet 200

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY:

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT
PRAHA - CZECHOSLOVAKIA

SAW BLADE SHARPENING MACHINE

Model BP 2

This machine is designed and built for the sharpening of blades of metal and wood circular saws. It can also be used for the grinding of teeth in solid blanks by applying a copying attachment. The sharpening of band and hacksaw blades is accomplished by the help of a fixture supplied on special order.

THE WHEEL SPINDLE

rotates in ball bearings and can be readily removed along with the bushing.

THE TABLE

moves in V-ways mounted on hardened gibs. One of the gibs is adjustable to enable the play in the table guideways to be easily taken up. The guideways are protected from dust which is collected in readily accessible container provided underneath the grinding wheel. To the neck of the container the hose of a dust sucking equipment may be attached.

THE SLIDE

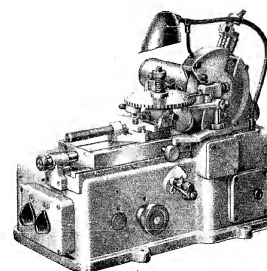
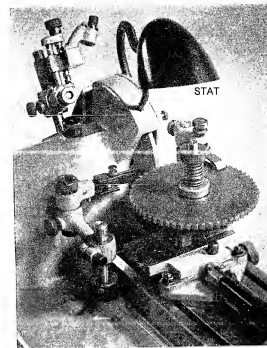
for clamping the saw blades is adjustable on the table. The fine feed of the slide into the cut is effected by a handwheel. The clamping fixture for blades of circular saws can be tilted from its horizontal plane. The machine is easily adjusted by handwheels used for setting: the tooth pitch, the table feed, the tooth face angle, the size of chips removed.

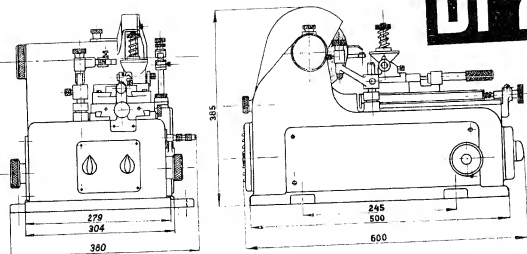
STANDARD EQUIPMENT:

1 built-in grinding wheel, 2 quick-clamping fixtures (for clamping small and big saw blades), 3 centering tapers, 1 interchangeable feeding pawl with pins, 2 copying attachments (for small and big saw blades), set of spanners, operator's instruction booklet.

OPTIONAL EQUIPMENT:

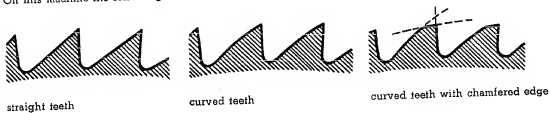
Attachment for sharpening hand and hacksaw blades for cutting metal and wood, wheel truing device.



BP2**SPECIFICATIONS.**

External diameter of circular saw blade	mm	20-350	$1\frac{1}{4}''-13\frac{1}{2}''$
Bore of saw blade	mm	5-50	$\frac{3}{16}''-2''$
Maximum thickness of saw blade	mm	10	$\frac{3}{16}''$
Tooth pitch	mm	0-15	$0-\frac{9}{16}''$
Height of teeth	mm	0-12	$0-\frac{1}{2}''$
Output of machine	teeth per minute	150	150
Wheel spindle speeds	r. p. m.	4150	4150
Peripheral speed of grinding wheel	m/sec	32	ft. p. m. 105
External diameter of grinding wheel	mm	150	6"
Bore of grinding wheel	mm	20	0.788"
Electric motor speed	r. p. m.	1380	1380
output	HP	0.35	0.35
Dimensions of machine	mm	580x390x400	22 $\frac{1}{4}''$ x15 $\frac{1}{4}''$ x15"
Contents boxed	mm	500x500x750	19 $\frac{3}{4}''$ x19 $\frac{3}{4}''$ x29"
Weight of machine	kg	85	lbs 190

On this machine the following kinds of teeth can be sharpened:



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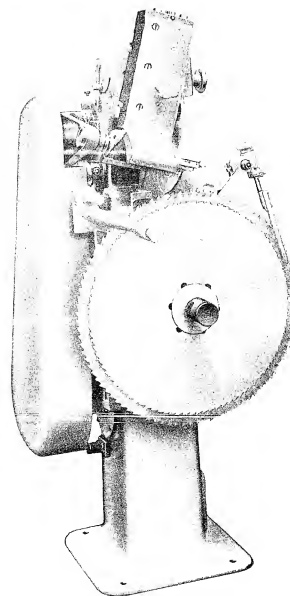
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PRAHA - CZECHOSLOVAKIA

Printed in Czechoslovakia

STROJEXPORT

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BP**SAW SHARPENING MACHINE BP 12**

This machine is intended for the correct and effective sharpening of saw teeth at any angle or rake.

The wheel-head slides in the V-guides of the column at an angle of 15 deg. The play is eliminated by adjustable gibs. The stroke of the wheel-head may be changed while cutting. The cam-operated motion of the wheel-head ensures the grinding of the correct profile of the saw teeth at any tooth pitch.

The wheel-head is mounted in precision antifriction bearings and driven by a flat belt from the gear box through an idler and a driving pulley. The spindle unit with the spindle is adjustable on the segmental guides of the wheel-head.

The gearbox with the two-speed stroke of the wheel head is driven by a flat belt from the electric motor located at the rear of the machine. It is totally enclosed and protected from the abrasive dust. Rapid motion is provided for saw blades of small diameters and for small tooth spaces.

The work side of the swivel type for clamping the saw blade can be adjusted on a dial provided on the column, to suit the required cutting angle. The saw blade is automatically indexed by means of a dividing attachment so that even damaged saw blades can be resharpended.

The lubrication of all moving parts of the gearbox is by a plunger pump.

The dust exhaust attachment collects the abrasive dust in the lower part of the column.

Specifications:

Diameter of saw blade	mm	260—1210	7 ¹¹ / ₁₆ "—47 ¹ / ₂ "
Minimum bore of saw blade	mm	30	1 ¹ / ₄ "
Grinding wheel: diameter × width	mm	220×13	8 ¹¹ / ₁₆ "×1 ¹ / ₄ "
bore	mm	40	1.58"
Main drive motor: Speed	r. p. m.	1500	1500
Output	kW	0.75	0.75
Floor space required	mm	900×1000	35 ¹ / ₂ "×39 ¹ / ₂ "
Weight of machine: with standard equipment	kg	400 approx.	880 lbs
with packing	kg	485 approx.	1070 lbs
with seaworthy packing	kg	650 approx.	1210 lbs
Contents boxed	m ³	1.9	67 cu. ft.

Standard equipment:

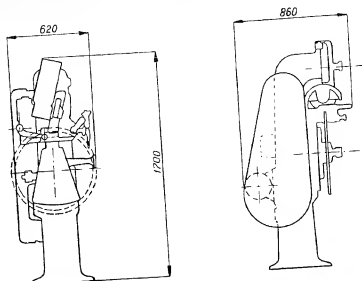
Electric motor with electrical equipment, 1 set of belts, dust exhaust attachment, grinding wheel dia 220/13 mm, spanners, operating instructions.

Optional equipment:

Indexing plates as per special list sent on request.

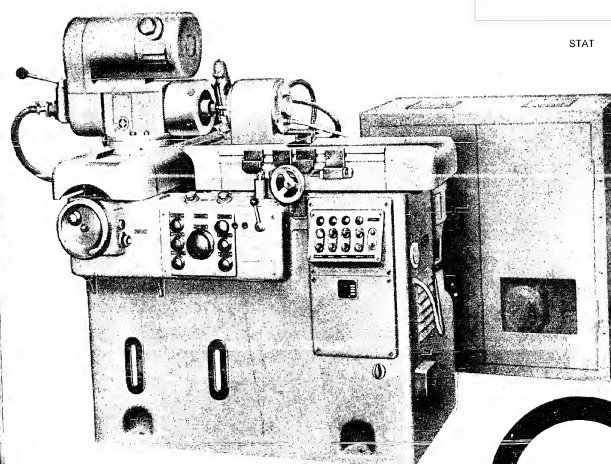
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STROJEXPORT

PRAHA — CZECHOSLOVAKIA
Produced in Czechoslovakia



STAT

AUTOMATIC HOLE GRINDER Model

BDA 20

This Heavy Duty Precision Machine is adapted to the grinding of cylindrical holes up to dia. 60 mm and maximum length of 75 mm as well as to the grinding of tapered holes up to 80 deg.

The automatic working cycle and the automatic checking of the dimensions being ground make the machine especially suitable for the grinding of holes in the quantity production. However, the ease of adjustment of the machine enables the economical grinding also in smaller lots or even in the single part production.

The ingenious design with the new mounting of both tables ensuring an accurate and smooth running of the machine, the careful selection of all materials and the accurate mechanical and heat-treatment of all parts guarantee the high precision and reliability in service of the machine.

GENERAL DESCRIPTION

The Column is of the boxed type and incorporates both the oil and the coolant tank.

The Longitudinal and the Cross Slide move in special multi-row ball bearings on accurately ground cylindrical bars ensuring high precision and smooth running.

The Work Head is mounted on the cross slide which enables it to be moved aside for reloading the machine or for measuring the workpiece. Also the table stroke is fully utilized, in this way. The work spindle rotates in adjustable plain bearings and is provided with a standardized flange for attaching any type of chuck or clamping fixture. The spindle is driven by an infinitely variable motor.

The Automatic Wheel Truing Device is mounted on the rear of the work spindle.

The Controlling Mechanism of the table drive and of the automatic functions of the machine is incorporated in the box on the front of the column. The functions of all controls are given on operating plates. After having been correctly set-up the machine can be operated by an unskilled worker.

The Wheel Head rests on the longitudinal table and the wheel spindle rotating in precision bearings carries the armature of a high-speed electric motor. By this direct drive all undesirable influences caused by transmission gears are eliminated and thus a high-quality surface finish is obtained.

The Frequency Changer supplying electric current of a higher frequency to the wheel spindle motor is incorporated in a separate box which can be located in another room to save the floor space.

SPECIFICATION

Diameter of hole being ground (depending on length of grinding)	mm	10—60	0.4"—2.35"
Maximum grinding length (depending on the diameter of hole)	mm	75	2.95"
Maximum capacity (through clamping fixture)	mm	120	1.7"
Maximum capacity (outside the fixture)	mm	260	7.5"
Workhead swivels	mm	0—45°	0—45 deg.
Maximum stroke of table	mm	160	6.3"
Maximum stroke of cross slide	mm	160	6.3"
Speeds of work spindle (infinitely variable)	r.p.m.	100—1000	100—1000
Speeds of wheel spindle (4 in number)	r.p.m.	12000, 18000, 27000, 40000	
Table speed during the working cycle (infinitely variable)	m/min.	0—6	0—230 in. p.m.
Output of work head motor	kW	0.8	0.8
Output of wheel head motor	kW	0.74—3	0.74—3
Output of pressure pump motor for the table drive and the control of the automatic functions of the machine	kW	2.2	2.2
Output of coolant pump motor	kW	0.15	0.15
Output of frequency changer motor	kW	7.5	7.5
Floor space required for machine	mm	1600×1170	63"×46"
Floor space required for frequency changer	mm	1100×580	43"×23"
Weight of machine	kg	1400	3100 lbs
Weight of frequency changer	kg	400	890 lbs
Over-all weight of machine with standard equipment	kg	2150	4750 lbs
Dimensions of case	mm	1800×1460×1560	75"×57"×60"

STANDARD EQUIPMENT

Complete extended wheel spindle
Various extensions with grinding wheels
Diamond bracket (less diamond)
Feeding cans for grinding allowances of 0.5 — 0.15 — 0.6 mm on the dia.
Set of spanners and grease gun
Operator's instruction booklet

OPTIONAL EQUIPMENT

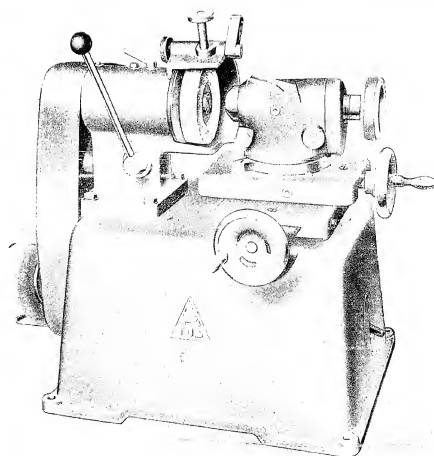
3-jaw quick-clamping chuck with 6 sets of change jaws
for clamping diameters of 10—60 mm

1 complete
3 pieces
1 piece
3 pieces

1 complete

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA - CZECHOSLOVAKIA



VALVE GRINDING MACHINE Type

The machine is intended for the grinding of the bevelled seating surface of internal combustion engine valves. It is marked by a design which is simple, yet remarkably well fitted to its purpose, and by a high degree of precision.

The wheel spindle runs in two sturdy radial ball bearings mounted in a sleeve which can be moved radially by means of a hand lever and locked in its set position by a handle. The spindle is driven by an electric motor fitted separately in the stand by means of an endless woven belt. The belt is tightened by an adjustable tightening pulley.

The workhead swivels round a pin fitted in the upper slide. The angle of swivel can be read on a scale. The head is locked in its set position by a clamp. The position for the grinding of a standard 90° taper can, in addition, be locked by a removable pin. The work spindle is driven from the motor by a V-belt through a countershaft, a flexible shaft and a worm gear. The spindle runs in a plain bearing.

The slides of the workhead are carried in wide and long V-ways the play of which is easy to adjust. The valves are chucked, at both sides, in interchangeable collets by means of a handwheel. The machine is also suitable for grinding the valve stem face by inserting the valve stem into the prismatic guideway at the top of the workhead set at the normal angle of 45°, rotating it and pressing it lightly against the face of the grinding wheel.

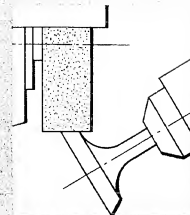
A circular wire brush is arranged at the left-hand side of the stand for the cleaning of the valve of carbon before grinding. For the truing of the grinding wheel to the proper diameter a wheel dresser is supplied with the machine.

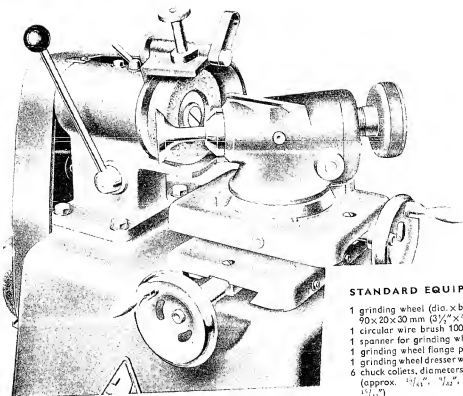
It is inserted into the opening in the grinding wheel guard. Truing is done by moving the wheel on the wheel head.

For face truing a lever with a pin is used which is inserted into the opening in the grinding wheel guard and locked by a nut. Before the face truing operation is started the wheel spindle is secured against axial movement by being locked in its rear position by means of the lever on the wheel head.

The truing is done by swinging the lever on the wheel head and, simultaneously, tightening the wheel dresser by means of its screw.

All moving parts are lubricated by means of oil nipples into which oil is pressed by an oil gun which is supplied with the machine. The general design of the machine is such that a compact, enclosed unit has been obtained. The moving parts are protected from dust so that the machine is easy to clean and the rate of wear of the whole machine is extremely low.





STANDARD EQUIPMENT

- 1 grinding wheel (dia. x bore x width) 90 x 20 x 30 mm (3 1/2" x 1 1/2" x 1 1/4")
- 1 circular wire brush 100 mm (4") dia.
- 1 spanner for grinding wheel flange
- 1 grinding wheel flange puller
- 1 grinding wheel dresser with lever, pin and nut
- 6 chuck collets, diameters 6, 7, 8, 9, 10, 12 mm (approx. 1/4", 5/16", 1/2", 5/8", 3/4", 1 1/8")
- 1 oil gun
- 1 equipment cabinet
- 1 operating instruction booklet

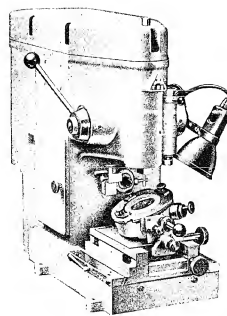
SPECIFICATION

Maximum diameter of workpiece	mm	100	3 1/2"
Chuck range, diameter	mm	6 to 15	1/8" to 3/4"
Work head swivel			60°
Work spindle speed, approx.	r. p. m.	80	3 1/2"
Cross travel of work spindle	mm	90	3 1/2"
Longitudinal travel of work spindle	mm	90 x 20 x 30	3 1/2" x 1 1/2" x 1 1/4"
Dimensions of grinding wheel, dia. x bore x width	r. p. m.	100	4"
Grinding wheel speed, approx.	kW	0.2	20 1/2"
Diameter of circular wire brush	mm	515	20 1/2"
Output of motor	mm	385	15"
Dimensions of machine: length	mm	415	16 1/2"
width	mm	60	132 lbs
height	kg		
Weight of machine with standard equipment, approx.			

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.

As improvements in design are continually being made, the above specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA - CZECHOSLOVAKIA



THREADING DIE GRINDER

Model



This Heavy Duty Precision Machine is intended for the grinding of all types of thread cutting dies, to prolong their life and increase their utilisation.

THE WHEEL SPINDLE rotates in three pairs of angular-contact ball bearings and is driven by an endless woven texrope from the countershaft. The spindle speed is approx. 24,000 r. p. m. The grinding wheels are employed in a size to suit the dimensions of the dies to be ground and are clamped in the spindle by means of a collet.

THE DIE-HOLDER is brought into its working position by the longitudinal and cross feed. The dies are clamped in the die-holder head directly or by using inserts. The head swivels ± 20 deg. according to a scale.

THE WHEEL TRUING DEVICE is provided for dressing or tapering the wheel by means of the diamond.

THE DUST EXHAUST ATTACHMENT is arranged for exhausting the dust from the die-holder head or from the truing device. The dust is collected in the dust separator from where it is removed after a certain time.

THE DRIVE is by a self-contained electric motor. The power is transmitted by 2 V-belts through the countershaft which is coupled to the dust exhaust attachment. The motor switch is located on the right-hand side of the machine.

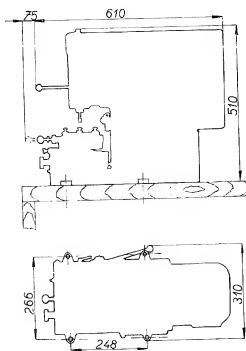
THE BULB on a swiveling arm gives sufficient light in all directions.

STANDARD EQUIPMENT: Electric motor with switch and fuses, truing device (less diamond), dust exhaust attachment, 3 grinding wheels dia. 3, 6 and 8 mm, spot light, set of spanners, operator's instruction booklet.



Specifications

		Metric	Imperial
Maximum dimensions of the die: External dia	mm	75	2.95"
Metric thread		M 42	
Whitworth thread			1 5/8"
Spindle speeds	r. p. m.	24000	24000
Stroke of spindle	mm	60	2.36"
Cross/longitudinal feed of die-holder	mm	32/50	1.26"/2"
Number of graduations on the die-holder		3, 4, 5, 6	3, 4, 5, 6
Die-holder swivels up to		± 20	± 20 deg.
Tracing device swivels up to		0, 30, 45	0, 30, 45 deg.
Diameter of diamond-holder	mm	6	0.236"
Motor: Output	HP	0.75	0.75
Speed	r. p. m.	2770	2770
Speed of dust exhaust fan	r. p. m.	8000	8000
Overall height of machine	mm	510	20"
Floor space required	mm	310 610	12.2" 24"
Weight of machine	kg	65	144 lbs.
Weight of machine with packing	kg	85	188 lbs.
Contents boxed	m ³	0.20	7 cu. ft.



IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

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STROJEXPORT · PRAHA · CZECHOSLOVAKIA

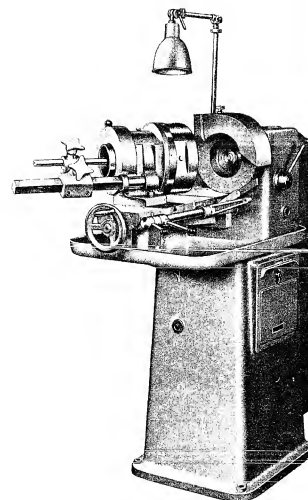
Printed in Czechoslovakia

T O S D R I L L G R I N D E R**MODEL BNV 75****GENERAL DESCRIPTION**

The wheel head is driven by a belt directly from the motor. The spindle is eccentrically supported in a quill so that the grinding wheel performs a planetary motion. In addition the quill is provided with an axial cam which causes an oscillating motion of the spindle, so that the grinding wheel performs three motions simultaneously. By this combined motion conditions are produced for generating a proper drill point and clearance.

A single belt drive to wheel head and gear box is provided. The gear box serves for producing the rotary and axial motion of the wheel spindle quill and for driving the chuck. The oscillating motion of the spindle can be stopped while running by a lever controlling a special clutch which always stops the oscillating motion of the spindle in the same starting position thus making possible the changing and clamping of the drill.

The two-jaws drill chuck is driven from the gear box by a telescope shaft and is bolted to the carriage which enables its approaching to the grinding wheel. The wheel truing device as well as the adjustable gibs are mounted on the chuck carriage. The lubrication of the spindle quill is by a gear pump housed in the gear box. The gear box mechanism runs in an oil bath. The other parts, as well as the spindle are lubricated by hand. The electrically driven coolant pump is situated at the side of the machine. The coolant tank is incorporated inside the base. The electrical equipment consists of the main drive and coolant pump motors. These are started directly by switches provided on a built-in panel which is equipped with a transformer and a spot light switch for 24 volts.



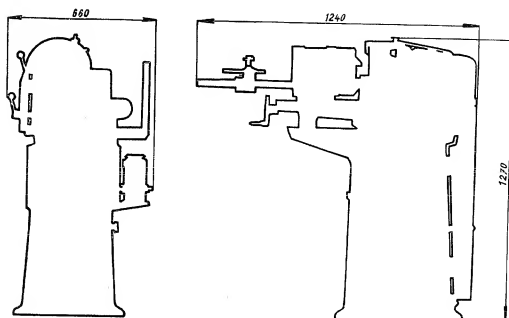
This fast operating precision machine tool has been designed exclusively for the grinding of two-flip twist drills. The drills are held between two self-centring chuck jaws revolving continuously while grinding. The special drill point ground on this machine permits the drilling with less feeding pressure and less power as compared with drills ground on other machines.

SPECIFICATIONS

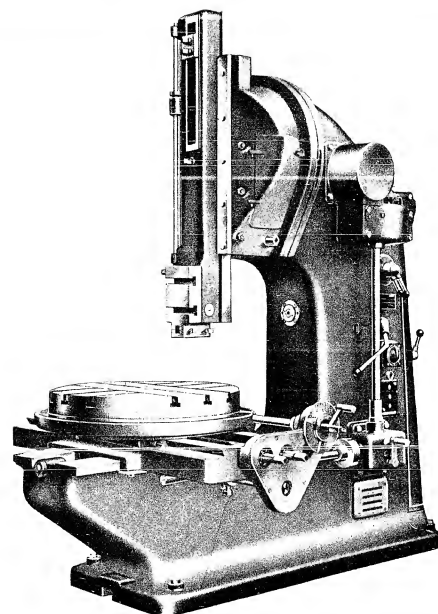
		Metric	English
Drill size capacity: minimum dia.	mm	6	1/8"
maximum dia.	mm	75	3"
Minimum angle of cutting lips	mm	80°	80°
Maximum angle of cutting lips	mm	160°	160°
Grinding wheel: outer dia.	mm	225	8.8"
hole, dia.	mm	154	4.85"
width	mm	50	2"
Travel of carriage	mm	90	3 1/2"
Speed of grinding wheel	R. P. M.	2200	2200
Speed of chuck	R. P. M.	1400	1400
Main motor: Speed	R. P. M.	34	34
Output	kW	1.5	1.5
Pump motor: Speed	R. P. M.	2800	2800
Output	kW	0.15	0.15
Hydraulic pump capacity	litres p. min.	10	2.2 gal
Floor space required	mm	1240 x 660	49" x 26"
Weight of machine: with standard equipment	kg	500	1100
with packing	kg	550	1210
with seaworthy packing	kg	700	1540
Dimensions of box	mm	1500 1450 1000	57" 57" 39"

WHEN ORDERING SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

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STROJEXPORT - PRAHA - CZECHOSLOVAKIA



SLOTING MACHINE MODEL ST 350

THE DRIVE is by V-belts from an electric motor through a 6-speed gear box and link mechanism. Starting and stopping of the machine is effected by a multiple disc clutch with brake which enables the stopping of ram in any position.

THE RAM is vertically adjustable up to 400 mm, has flat guideways and may be tilted to a maximum of 10° in both directions. Its accurate setting is done by means of a vernier. The tool is lifted automatically.

THE ROTARY TABLE rests on a compound slide which is guided within V-ways on the knee. On its circumference the table is provided with a dial graduated in degrees for indicating the angular setting. In the centre of the table is a hole for the central mandrel which is employed for circular cutting. The table is accurately indexed by a built-in hand-operated indexing attachment. The longitudinal, cross and circular feed of the table is by hand and by power. The feed range and feed direction can be changed while cutting. The table surface is provided with T-slots for clamping the work.

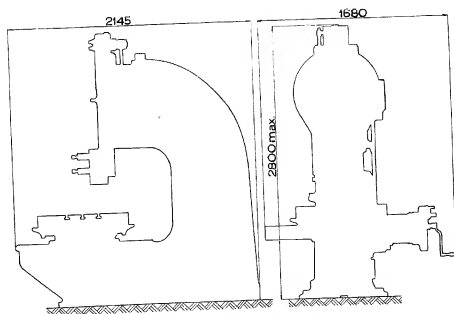
350

STANDARD EQUIPMENT: Electric motor with electrical equipment, 2 tool boxes, set of service spanners, base plate for motor, V-belts, motor pulley, indexing attachment, operator's instruction booklet.

SPECIFICATIONS

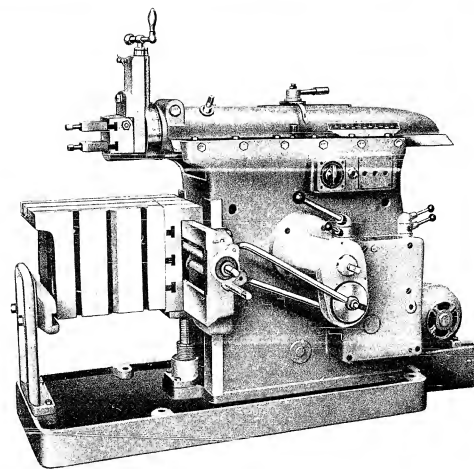
	Metric	English
Maximum length of stroke	350 mm	14"
Diameter of rotary table	800 mm	31½"
Cross travel of table	650 mm	25½"
Longitudinal travel of table	700 mm	27½"
Distance, tool edge to ram guides	215 mm	8½"
Distance, table to ram guides	560 mm	22"
Number of speeds	10-56	10-56
Number of strokes per minute (up and down)	0-2	0-0.05"
Feeds: 6 longitudinal and cross feeds, infinitely variable	1400	1400
Motor Speed	HP	5.5
Output	mm	1700×2150
Floor space required	kg	3880
Weight of machine: with standard equipment	kg	3880
with railway packing	kg	4500
with seaworthy packing	m³	10
Contents boxed		355 cu. ft.

WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY:



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PRAHA - CZECHOSLOVAKIA



SHAPING MACHINE MODEL VOB 600

This machine is suitable for a general line of shaping on plane surfaces. The swivelling tool head carrying the tool slide may be adjusted also for angular cutting.

High output, enduring accuracy and reliability in service are characteristic features obtained as a result of the rich experiences gathered under the most different operating conditions.

The accuracy of work is guaranteed by the heavily dimensioned and ribbed machine base, wide guideways both for the vertical and cross adjustment of table and by the precision workmanship of the whole machine. The play in the V-guides of the ram is eliminated by an adjustable gib.

The machine has 8 cutting speeds which are easily changed by two hand levers arranged on the gearbox. The ram is driven by an enclosed link mechanism with wide sliding surfaces for the sliding block which rotates on the pin of the wide rocker arm driving gear.

The table is vertically adjusted by a hand crank. The cross adjustment is by hand and automatic, infinitely variable. The tool slide may be fed by hand and automatically, with infinite variation. The machine is driven from an electric motor by V-belts with provision of an easy belt tension adjustment.

The splash system of lubrication of the gearbox, and the centrally arranged and easily accessible controls greatly contribute to a quick and easy operation of the machine.

VOB

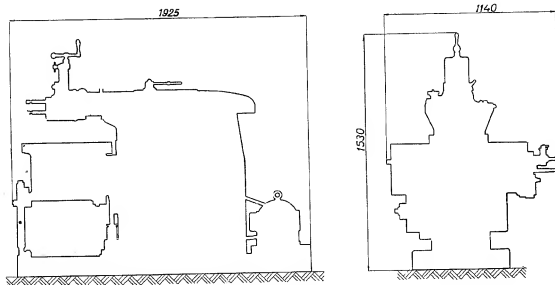
SPECIFICATIONS

	Metric:	English:
Maximum cutting length	mm 600	23 5/8"
Clamping surface of table (width × length × height)	mm 360 × 600 × 360	14 1/8" × 23 5/8" × 14 1/8"
Vertical travel of table	mm 280	11"
Cross travel of table	mm 675	26 5/8"
Vertical travel of tool slide	mm 125	4 7/8"
Maximum/minimum distance, table to tool slide	mm 390/115	15 3/4" × 4 1/2"
Number of cutting speeds	8	8
Number of double strokes per minute	12—112	12—112
Automatic cross feed of table per 1 stroke	mm 0.14—1.4	0.005"—0.055"
Automatic feed of tool slide per 1 stroke	mm 0.17—1.2	0.006"—0.047"
Main drive motor: Speed	r. p. m. 1420	1420
Output	HP 5.5	5.5
Floor space required	mm 1140 × 1925	45" × 76"
Weight of machine with: Standard equipment	kg 1870	4120 lbs
Railway packing	kg 1915	4230 lbs
Seaworthy packing	kg 2215	4890 lbs
Contents boxed	m ³ 4.6	162 cu. ft.

STANDARD EQUIPMENT: Electric motor with electrical equipment, tool holders, set of spanners, V-belts, motor-pulley, operating instruction booklet.

OPTIONAL EQUIPMENT: Swivel vice — width of jaws 250 mm, maximum chucking width 300 mm.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.



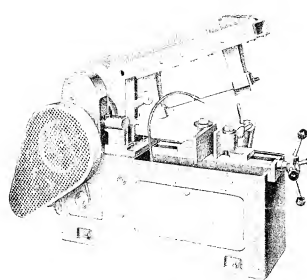
As improvements in design are continually being made, the above specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STADJEXPORT PRAHA - CZECHOSLOVAKIA

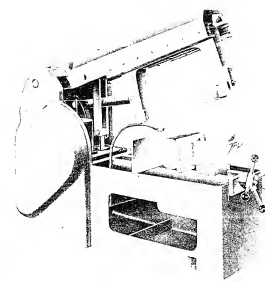
Printed in Czechoslovakia

METAL SAWING MACHINES

STAT



HACKSAW MACHINE Type PR 20



HACKSAW MACHINE Type PR 30

HACKSAW MACHINES Types PR 20 and PR 30

Machines for the cutting of metals of various shapes and hardness. The arm is controlled hydraulically by a single lever. The pressure of the arm increases gradually in the course of the cut and the arm is relieved during the return movement. The cut being finished the arm returns automatically to its raised position which is adjustable according to the size of the material being cut.

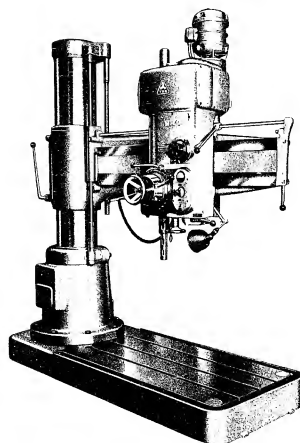
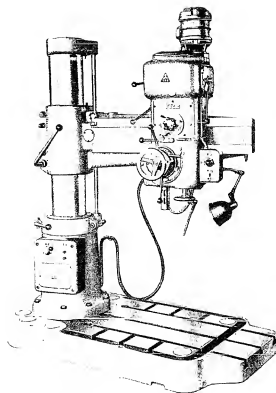
Type	PR 20	PR 30
Maximum size of square and round material	77.8"	113.4"
Maximum size of material cut at 45°	417.32"	73.32"
Stroke of frame	51 1/2"	77.8"
Number of double strokes of saw blade per minute	104 to 84	80 to 60
Power of motor	1 HP	2 HP
Floor space required	1'10" × 5'1"	2'10" × 5'1"
Weight of machine with standard equipment	1040 lbs	2250 lbs

PRAHA - CZECHOSLOVAKIA

RADIAL DRILLING MACHINES

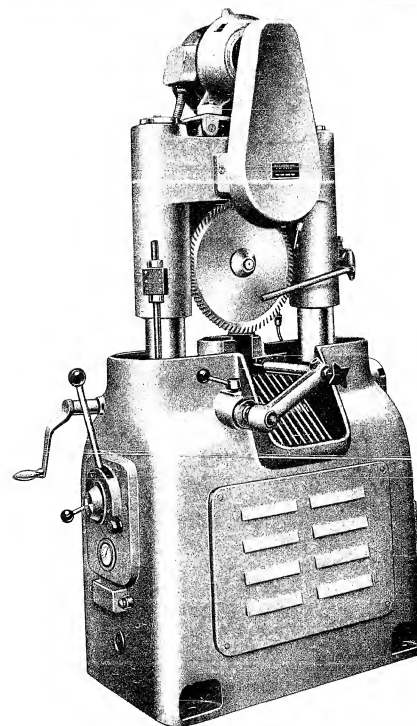
RADIAL DRILLING MACHINES Types VR 2 and VR 4

The machines are intended for the drilling and boring of holes, as well as for the cutting of threads in large and intricate machinery parts. Due to their very short setting-up times, these machines, when equipped with suitable lugs and fixtures, are superior to horizontal boring machines in many respects. The drilling machines are distinguished by their high output, enduring accuracy, wide range of spindle speeds and power feeds, raising of the arm by power, and the VR 4 machine by its preselection of spindle speeds.



Type	VR 2	VR 4
Maximum diameter of drilling in steel with a tensile strength of 60 kg per mm ²	1"	1 9/16"
Maximum diameter of drilling in cast iron with a tensile strength of 25 kg per mm ²	1 3/8"	2"
Maximum diameter of boring in steel with a tensile strength of 60 kg per mm ²	2"	3 9/16"
Maximum size of thread cut in steel with a tensile strength of 60 kg per mm ²	5/8"	1 5/16"
Maximum distance, column to centre line of spindle	21 1/2"	49 1/2"
Max./min. distance, spindle to base	40" / 10 7/16"	51" / 10 1/4"
Number of spindle speeds	12	12
Power of drilling motor	2 HP	4 HP
Overall dimensions of machine	33" X 27 1/2" X 7'6"	33" X 3' X 9'5"
Weight of machine with standard equipment	2760 lbs	5620 lbs

PRAHA - CZECHOSLOVAKIA



**HYDRAULIC CIRCULAR
SAW MODEL**

H
350

HYDRAULIC CIRCULAR SAW MODEL

H
350

**Heavy Duty
Cold Sawing Machine
equally at home in medium size
and large shops both
with quantity and single part
production**

Outstanding features and advantages:

Four speeds of saw blade

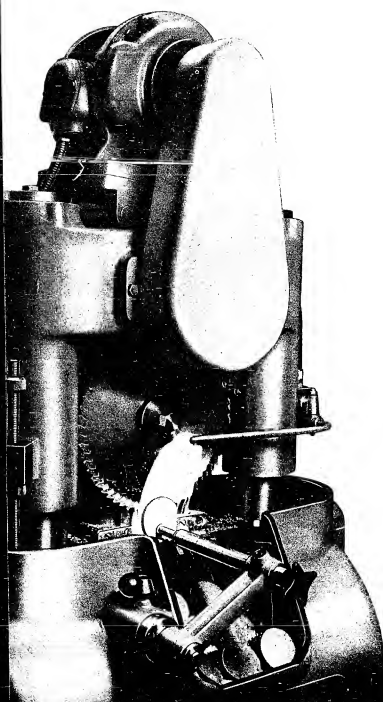
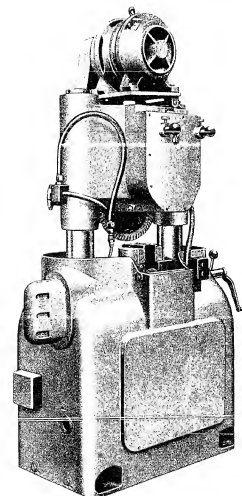
Hydraulic feed of saw blade into
the cut infinitely variable

Hydraulic clamping of material

THE HEADSTOCK slides on the two-column guide-ways. The saw blade is clamped to the spindle. The transmission gears inside the headstock provide 4 cutting speeds of the saw-blade. Power is transmitted by V-belts from an electric motor mounted on a hinged plate. All shafts rotate in anti-friction bearings and the transmission gears are running in an oil bath. Both the headstock feed into the cut and the rapid return proceed hydraulically. The feed speed is infinitely variable to suit the tensile strength and the dimensions of the material to be cut. Adjustable feed stops are provided for limiting the feed height and for automatic feed release.

THE COLUMN with the column ways and the headstock form a rigid frame to eliminate vibrations of the machine even at peak output. It contains the hydraulic system with the power unit and the oil tank as well as the cooling attachment with the coolant tank, and the readily accessible chip space.

THE CLAMPING ATTACHMENT is operated hydraulically the clamping pressure being always higher than the pressure for the headstock feed. Both pressures are checked on a pressure gauge provided on the control panel which is fixed to the column. The vice clamps securely the stock even before the saw blade feed into the cut has started. The stock to be cut is always located accurately opposite the centre of the saw blade so that the saw blade feed proceeds always on the shortest path. Thus the shortest possible cutting time is achieved. Both the headstock feed and the material clamping are operated by a single hand lever. The machine is equipped with a complete cooling attachment. Coolant water is supplied to the work in a sufficient quantity on both sides of the saw blade.

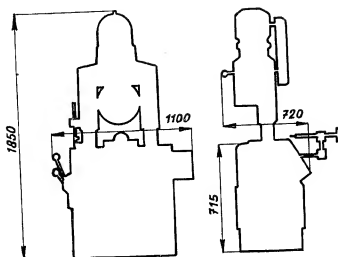


STANDARD EQUIPMENT:
Saw-blade, 2 motors with pulleys and V-belts, electrical equipment including switches and fuses, cooling attachment, pressure pump, operating instructions.

OPTIONAL EQUIPMENT:
Material feed.

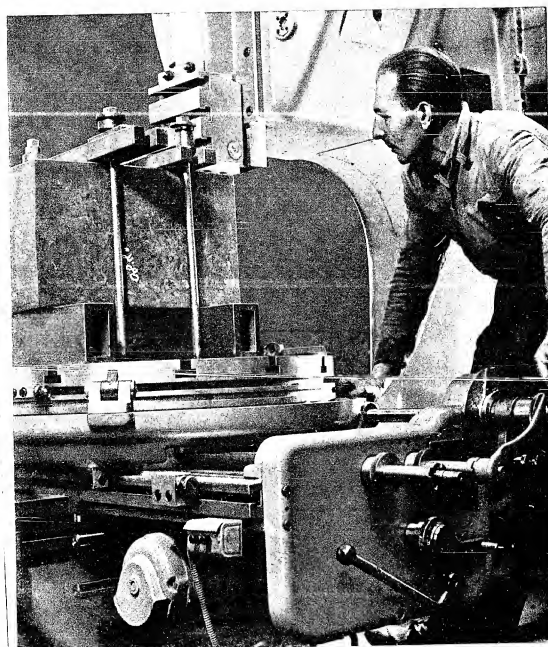
SPECIFICATIONS:			
Max. dia. of saw-blade	mm	360	
Max. dimensions of stock: round stock	dia. mm	110	
square stock	mm	100 X 100	
flat stock	mm	4	
Number of cutting speeds:	mm	210	360
Cutting speed with the saw-blade dia.:	mm/min	9.8	11.3
at 10 r.p.m. of saw-blade	mm/min	13.6	15.8
at 14 r.p.m. of saw-blade	mm/min	17.5	20.3
at 18 r.p.m. of saw-blade	mm/min	23.3	29.4
at 26 r.p.m. of saw-blade	mm/min	0-500	
Hydraulic feed infinitely variable and ranging from:	mm/min	500	
Rapid return	r.p.m.	1300	
Headstock motor: speed	HP	4	
output	r.p.m.	1400	
Pump motor: speed	HP	1	
output	r.p.m.	1100 X 700	
Floor space required	mm	760	
Weight of machine with standard equipment	kg	850	
Weight of machine with packing	kg	920	
Weight of machine with sawworthy packing	kg	155 X 80 X 160	
Dimensions of case	mm	1.6	
Contents boxed	mm		

In ordering, specify voltage, phase and frequency of power supply.
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

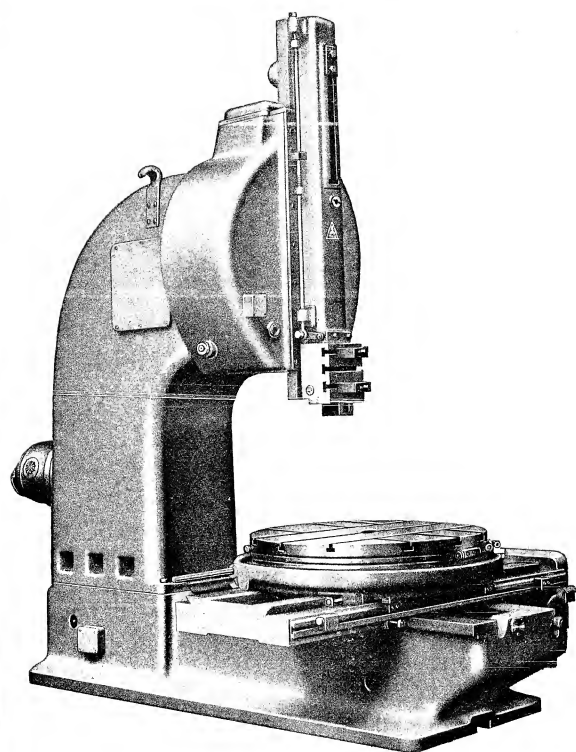


STROJEXPORT
PRAHA - CZECHOSLOVAKIA

STAT



SLOTING MACHINE
Model



SLOTING MACHINE Model HOV 63

is intended for slotting operations on medium size and large machine components. Its outstanding features are: Great Output, High Accuracy, Ease of Operation. The machine is equally well-suited for single part as well as quantity production.

GENERAL DESCRIPTION:

THE COLUMN is of sturdy construction, adequately reinforced and is cast integrally with the bed. A large overhang of the column enables the machining of a wide variety of parts.

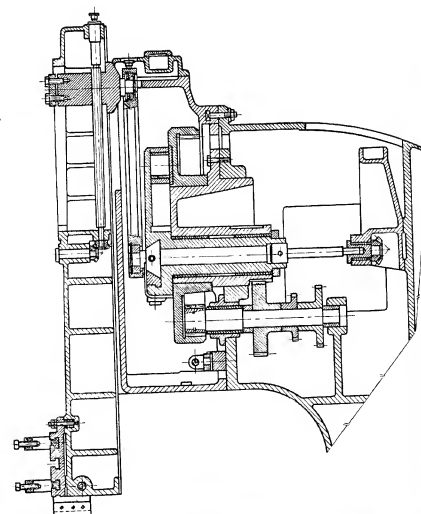
THE DRIVE is by V-belts from the motor through a multi-plate clutch in conjunction with a brake, and through a gear box mounted at the top of the column. The number of up and down strokes is changed by levers located at the front of the column. The clutch with the brake enables the stopping of the ram in any position.

THE RAM of exceptionally large section is fitted with flat guideways. The ram head swivels 10° in either direction. Accurate adjustment is made on a scale. The tool holder is lifted automatically. The ram is adjustable by 470 mm (18.5") and driven by a link mechanism.

THE TABLE of the circular type is fitted with T-slots. On its circumference it has a direct reading dial with 360 divisions. In the centre of the table is a taper hole for the central mandrel which is used for circular cutting. A built-in indexing attachment enables to obtain any number of divisions. The table feed in the longitudinal, cross and circular direction is by hand and automatic. The feed speed is infinitely variable in the range of 0.25-25 mm (0.01-0.1") per 1 stroke and the feed rate may be set both when the machine is at rest and while running. The machine is also arranged for rapid adjustment of the table in all directions. A safety clutch protects the table against overload. Adjustable stops for automatic feed release are provided.

THE LUBRICATION of the driving mechanism and of the ram is automatic by the central system. The oil pump supplies oil through an oil filter to the tank whence it flows through a piping to the individual oil points. Correct function of the lubrication may be watched in the sight windows.

Diagram of link mechanism.



SPECIFICATIONS

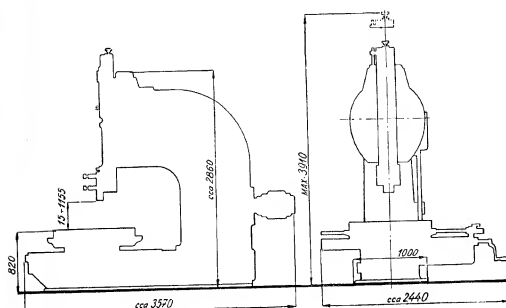
	Metric	English
Maximum height of stroke	mm 630	24.8"
Diameter of circular table	mm 1200	47.2"
Width/distance between T-slots	mm 24 250 0.940"	9.5"
Cross travel of table	mm 800	31.4"
Longitudinal travel of table	mm 1000	39.4"
Adjustment of ram	mm 470	18.5"
Distance, tool edge to column	mm 1100	43.3"
Distance, tool edge to ram guide	mm 290	11"
Distance, clamping surface of table to lower end of ram guide	mm 750	29.4"
Maximum distance of tool to clamping surface of table	mm 1140	44.9"
Cross adjustment of ram	mm 10"	10"
Number of speeds	9	9
Maximum safe cutting speed	m/min 40	157' per min.
Number of strokes per minute	7-15	7-15
Maximum pulling power	kg 7000	6000 lbs
Feeds: continuous longitudinal feed ranging from	mm 0.25-2.5	0.01"-0.1"
continuous cross feed ranging from	mm 0.25-2.5	0.01"-0.1"
Main drive motor: Speed	r. p. m. 1440	1440
Output	HP 20	20
Rapid traverse motor: Speed	r. p. m. 1900	1900
Output	HP 1.5	1.5
Coolant pump motor: Speed	r. p. m. 2800	2800
Output	HP 0.15	0.15
Quantity supplied	l/min 15	3.3 gals
Free space required (width x length)	mm 2440 3570	96" 140"
Weight of machine with standard equipment	kg 2200	50 000 lbs
Weight of machine with packing	kg 2600	57 000 lbs
Weight of machine with seaworthy packing	kg 10900	24 000 lbs
Contents boxed	m ³ 23	812 cu ft

STANDARD EQUIPMENT: Stops for transverse, longitudinal and circular feeds, 2 tool holders, set of spanners, 6 V-belts and V-belt pulley for motor, indexing attachment, electrical equipment including motors for main drive and rapid traverse, tool lifter, transverse, longitudinal and circular rapid traverse of table, operating instructions.

OPTIONAL EQUIPMENT: Cooling equipment, electric lighting including 220 Volt/24 Volt transformer.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!



STROJEXPORT
PRAHA - CZECHOSLOVAKIA

Threading and Tapping Machine

MODEL

PV5

This precision heavy duty machine is designed for a wide variety of threading and tapping operations both in series and mass production. In addition to standard threads, it will also produce left hand, trapezoidal, square and wood-screw threads, and when using taps it will also cut nuts.

THE MAIN SPINDLE

is driven by V-belts from the electric motor through a six-spindle gear box. The spindle speeds are changed by means of two hand levers. Starting and stopping of the spindle is effected by means of a lever which actuates the friction clutch.

THE DIE HEAD

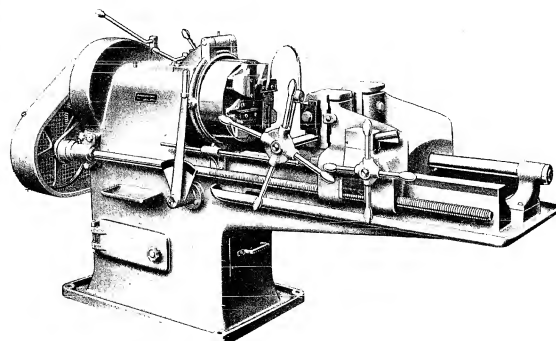
is controlled by a hand lever or automatically. The instant opening and closing of the tangential dies fixed in tilting holders is effected by means of stops.

THE CARRIAGE

with the vice for clamping the work is fed into the cut by power and by hand. The power feed is obtained from the main spindle through change gears and a lead-screw. The hand feed is effected by means of a star wheel. A stop rod serves for adjusting the thread length.

THE BED

has flat guideways for the carriage.

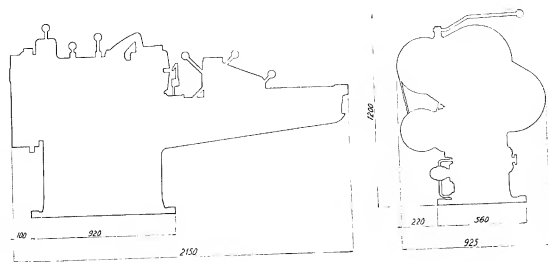


THE COOLING SYSTEM
consists of a coolant tank arranged in the lower part of the machine base, a gear pump mounted on the base which is driven by a flat belt from the main spindle, and piping with an adjustable nozzle.

STANDARD EQUIPMENT:
Die-head Model Ph 5, set of die holders profile B, set of die holders profile C, set of dies for taps, set of dies metric or Whitworth (alternatively), control spanner, setting gauge, 17 change gears for metric and Whitworth threads, 2 V-belts, bracket for electric motor, electric motor for spindle drive, three-pole switch, gear pump, flat belt for gear pump.

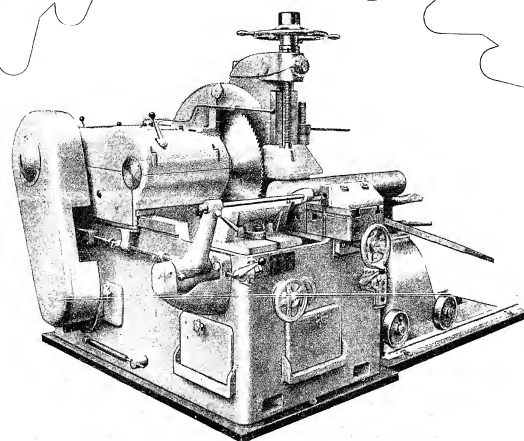
ADDITIONAL EQUIPMENT:
Complete sets of die holders for left hand, square, trapezoidal and gas threads, set of dies for each type of thread, taps.

	Metric	English
Threading capacities:		
metric threads	dia. 20—64 mm	—
Whitworth threads	dia. — mm	1/4" — 2 1/2"
gas threads	dia. — mm	1/2" — 2"
Bore of spindle	68 mm	2.67"
Height of centreline of spindle over bed	175 mm	6.9"
Cutting length without reclamping	550 mm	21.6"
Spindle speeds: 6 ranging from	23—105 r. p. m.	23—105
Electric motor: speed	1420 r. p. m.	1420
output	5 HP	5
Floor space required	925 x 2150 mm	36 1/2" x 85"
Weight of machine:	1250 kg	2760 lbs
with standard equipment	1450 kg	3200 lbs
with railway packing	1550 kg	3420 lbs
with seaworthy packing	3 m ³	106 cu. ft.
Contents boxed		



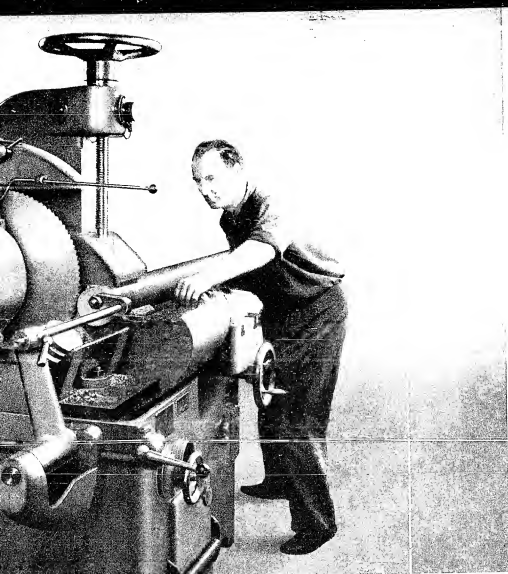
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT
PRAHA • CZECHOSLOVAKIA



Type P27 CIRCULAR SAW

P27



Type P27 Circular Saw

A Heavy Duty Machine for cold cutting of steel, suitable for medium size and large plants engaged in repetition work as well as in single piece manufacture.

Four speeds of saw blade.

Hydraulic feed into cut infinitely variable.

Automatic counter-pressure arrangement preventing undesirable acceleration of feed before beginning and on completion of cut or during sudden changes of cross section.

Hydraulic clamping of stock.

Semi-automatic operation of machine.

Ease of operation.

DESCRIPTION

Headstock. The headstock slides along the guideways of the bed. A tapered gib affords adjustment of the play. The gear box, which gives four speeds of the saw blade, is driven by the electric motor by means of a flat belt enclosed by a guard. A jockey pulley equalizes the distance between the shafts caused by the movement of the headstock.

The starting and stopping of the motor is controlled by a push-button by means of a combination of contactors with thermal and electromagnetic overload protection. The starting lever of the spindle and the brake are operated by a single hand lever. The bearings and all the rotating parts of the headstock are lubricated automatically.

Hydraulic Equipment. The hydraulic equipment consists of a gear pump with a control and distribution assembly and of the necessary working cylinders.

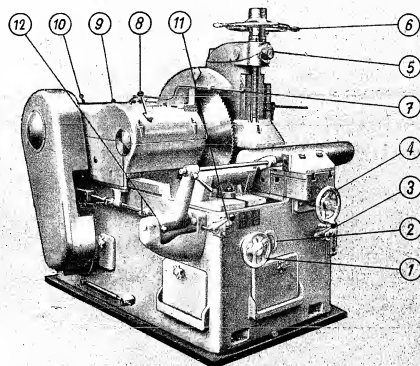
The hydraulic feed into the cut is infinitely variable by means of a hand wheel. It permits the rate of feed corresponding to the tensile strength and dimensions of the stock to be accurately set. The flexibility of the hydraulic feed affords a constant pressure into the cut during variations of the cross section. This preserves the saw blade and protects the machine from overload. An automatic counter-pressure arrangement prevents undesirable acceleration of the feed before the beginning and on completion of the cut or during sudden changes of the cross section. A stop mechanism is provided to limit the travel of the saw to the required length of cut on completion of which the stop disengages the feed and engages a rapid return movement of the headstock.

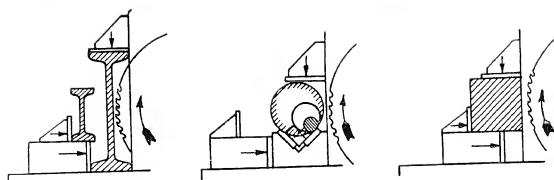
Clamping of Stock. The stock is clamped hydraulically by a vertical and a horizontal jaw so that a perpendicular cut is assured. The horizontal jaw is arranged for two heights of clamping to permit material of various cross sections to be clamped in the most suitable way at the height of the shortest cut.

Cooling equipment. The coolant is supplied to the point of cut from a tank formed in a part of the bed by a gear pump.

CONTROLS:

1. Hand wheel for control of feed.
2. Feed oil pressure gauge.
3. Lever for control of damping.
4. Hand wheel for horizontal clamping.
5. Clamping pressure gauge.
6. Hand wheel for vertical clamping.
7. Pull rod for coolant control.
8. Front clutch lever.
9. Gear change lever.
10. Rear clutch lever.
11. Lever for control of feed a rapid return movement.
12. Adjustable stops.





Suitable Methods of Clamping

Specification

Diameter of saw blade	mm	660	710	760
	inches	26	28	30
Maximum size of stock for perpendicular cuts:				
round stock	mm/inches	230/8 5/8	245/9 5/8	270/10 5/8
square stock	mm/inches	200/7 7/8	210/8 1/4	245/9 5/8
I-section, standard	size	47.5		55
I-section, broad	size	20		27
Maximum size of stock of slant cuts:				
I-section, standard	size	40		50
upright	size	13		17
I-section, broad, upright or horizontal	size		16	
Number of speeds of saw blade				
Speeds of saw blade	r.p.m.	5.5	7.5	10
Cutting speeds per min.				
saw blade 660 mm (26")	dia., metres	11.4	15.5	20.4
	feet	34 1/2	51	67
saw blade 710 mm (28")	dia., metres	13.2	16.6	21.8
	feet	40	54 1/2	72
saw blade 760 mm (30")	dia., metres	13.6	18.5	24.3
	feet	44 1/2	60 1/2	80
Range of infinitely variable hydraulic feeds	mm per min.	0 to 400	0 to 16"	per min.
Rapid return movement	mm per min.	2000	0 to 16"	per min.
Floor space of machine	mm/inches	1400 X 2100	56 X 83	
Weight of machine with standard equipment (design for perpendicular cuts):				
net	kg/lbs	3620 / 7980		
shipping, railway packing	kg/lbs	3670 / 8090		
shipping, seaway packing	kg/lbs	4320 / 9500		
Volume of packing case	cu. metres/cu. ft.	6 / 212		

STANDARD EQUIPMENT.

Cooling equipment, clamping equipment, electric motor with electrical equipment, set of spanners, tables, operating instructions.

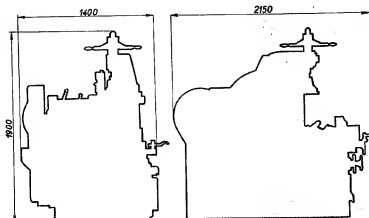
OPTIMAL EQUIPMENT:

Supporting truck and saw blades of various diameters according to separate quotation.

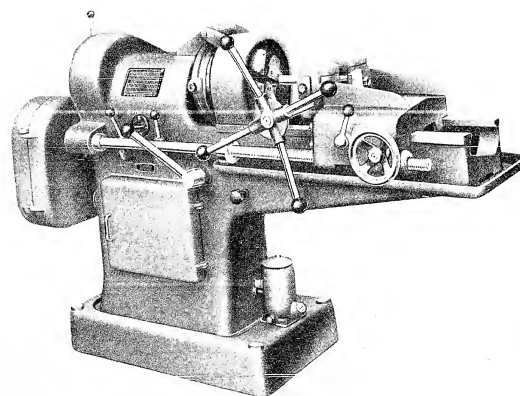
The machine can be supplied, to special order and against extra charge, arranged for slant cuts up to an angle of 45°.

Please state in your order the voltage available for the electric motors.

The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.



STROJEXPORT . PRAHA • CZECHOSLOVAKIA

PODHAJSKÝ THREADING MACHINE MODEL **ZV-1040**

is a precision heavy duty machine designed for threading jobs on a high production basis. Besides standard threads, also left hand, trapeze, flat threads, threads in wood, and when using taps, nuts can be cut on this machine as well.

WORK SPINDLE: The power transmission is from an electric motor by V-belts through a four-speed-gear box. Speed control is effected by two hand levers. The spindle reversion is governed by an electric switch. The starter is mechanically connected with a powerful blockbrake for instant starting and stopping of the machine. The hollow spindle enables the cutting of long threads.

DIE HEAD: This is operated by a hand lever. The instant opening of the chasers is effected automatically or by hand. The tangential chasers are fixed in swivelling holders.

CARRIAGE: With a vice for clamping the work is powered by a lead screw through change gears located in an enclosed box. An adjustable stop automatically disengages the clasp nut. The vice is controlled by a cross lever. Inside the bed a stop bar is provided for setting the thread length.

BED: This is built as a compact unit. Its base plate contains the coolant reservoir. The spare chasers, chaser holders and change gears are placed in a box inside the bed. Chips are collected in a tilting pan.

COOLING ATTACHMENT: Spray cooling is provided in a folding die head cover. The coolant is supplied by an electric pump.

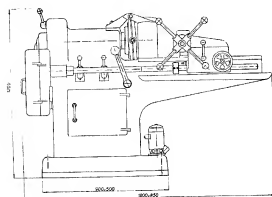
STANDARD EQUIPMENT: Die head Ph 3, 1 set chaser holders, 1 set chasers, 1 set chasers for taps, control spanner, adjusting gauge, 18 change gears, 2 V-belts, electric motor for spindle drive, electric motor for pump drive, reversing switch.

ADDITIONAL EQUIPMENT: Sets of chasers, respective chaser holders.

PRINCIPAL DIMENSIONS AND TECHNICAL DESCRIPTION:

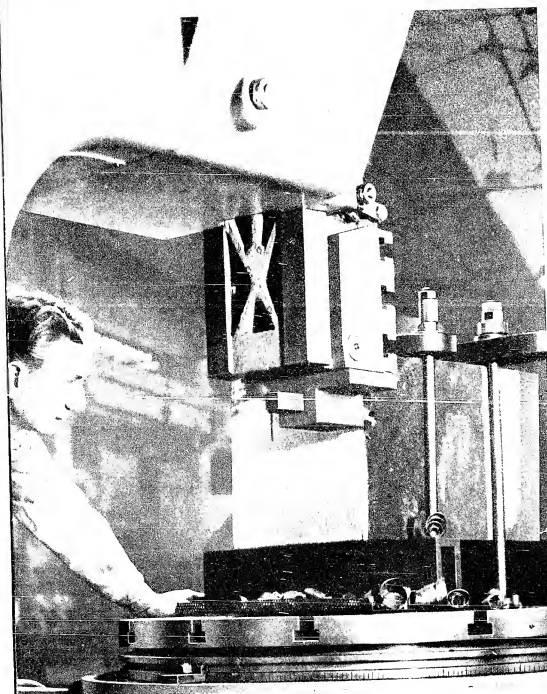
	Metric	English
Range of threads: metric mm	10—40	0.395"—1.58"
Whitworth		$1\frac{1}{4}$ "—1 $\frac{1}{2}$ "
gas		$1\frac{1}{4}$ "—1 $\frac{1}{2}$ "
trapeze mm	10—36	0.395"—1.42"
rounded mm	12—30	0.475"—1.18"
Bore of spindle mm	55	2 $\frac{1}{4}$ "
Distance, centreline of spindle to bed mm	125	5"
Cutting length without reclamping mm	400	15 $\frac{1}{2}$ "
Number of spindle speeds: 4 ranging from	42—156	42—156
R. p. m. of motor	1450	1450
H. P. of motor	3	3
Floor space required mm	850—1800	33 $\frac{1}{2}$ "—71"
Weight of machine: with standard equipment kg	820	1950 lbs
with railway packing kg	960	2120 lbs
with seaworthy packing kg	1080	2400 lbs
Contents boxed m ³	2.9	102 cu. ft.

As our machines are constantly being improved the above data are subject to alterations.



WHEN ORDERING, SPECIFY VOLTAGE, PHASE, AND FREQUENCY
OF POWER SUPPLY!

STROJEXPORT PRAHA-CZECHOSLOVAKIA



SLOTING MACHINE Model

GENERAL DESCRIPTION

THE COLUMN is of sturdy construction, adequately reinforced and is cast integrally with the bed. A large overhang of the column enables the machining of a wide variety of parts.

THE DRIVE is by V-belts from the motor through a multi-plate clutch in conjunction with a brake, and through a gear box mounted at the top of the column. The number of up and down strokes is changed by levers located at the front of the column. The clutch with the brake enables the stopping of the ram in any position.

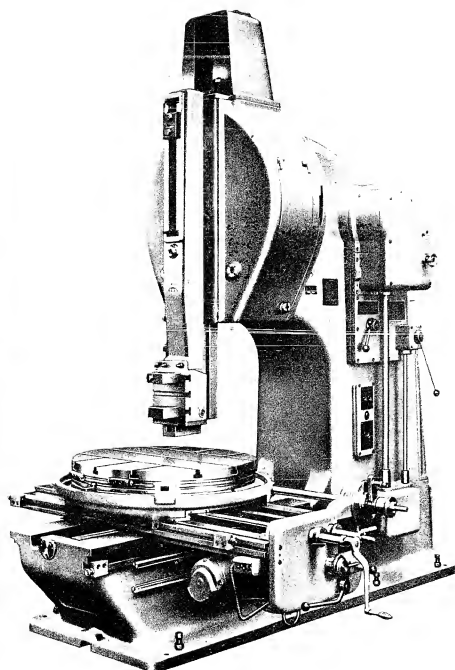
THE RAM of exceptionally large section is fitted with flat guideways. The ram head swivels 10° in either direction. Accurate adjustment is made on a scale. The tool holder is lifted automatically. The ram is adjusted by 500 mm (20") and driven by a link mechanism.

THE TABLE of the circular type is fitted with T-slots. On its circumference it has a direct reading dial with 360 divisions. In the centre of the table is a taper hole for the central mandrel which is used for circular cutting. A built-in indexing attachment enables to obtain any number of divisions. The table feed in the longitudinal, cross and circular direction is by hand and automatic. The feed speed is infinitely variable to the extent from 0.2—2 mm (0.008"—0.08") per 1 stroke and the feed rate may be set both when the machine is at rest and while running. The machine is also arranged for rapid adjustment of the table in all directions. A safety clutch protects the table against overload. Adjustable stops for automatic feed release are provided.

THE LUBRICATION of the driving mechanism and of the ram is automatic by the central system. The oil pump supplies oil through an oil filter to the tank whence it flows through a piping to the individual oil points. Correct function of the lubrication may be watched in the sight windows.

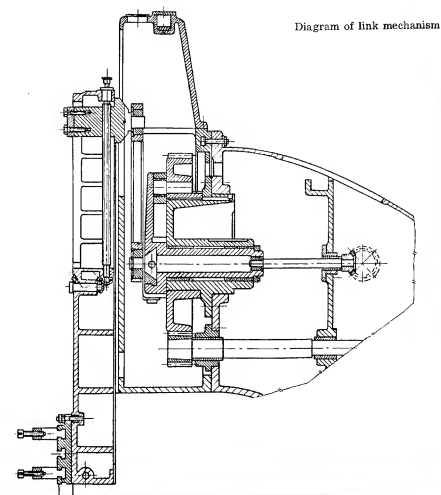
STANDARD EQUIPMENT: Main drive motor with electrical equipment, rapid traverse motor, indexing attachment, 2 tool boxes, V-belts, motor pulley, set of spanners, operating instruction booklet.

OPTIONAL EQUIPMENT: Cooling attachment.



SLOTING MACHINE MODEL HOV 45

is intended for slotting operations on medium size and large machine components. Its outstanding features are:
Great Output, High Accuracy, Ease of Operation.
The machine is equally well-suited for single part as well as quantity production.

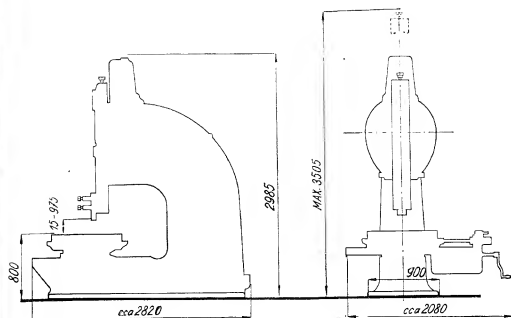


SPECIFICATIONS

	Metric	English
Maximum height of stroke	mm 50	1 7/8"
Diameter of circular table	mm 900	35 1/2"
Withstand distance between T-slots	mm 22.500	0.886" 7.88"
Cross travel of table	mm 750	29 1/2"
Longitudinal travel of table	mm 900	35 1/2"
Adjustment of ram	mm 500	19 7/8"
Distance, tool edge to column	mm 850	33 1/2"
Distance, tool edge to ram guide	mm 250	9 8/16"
Distance, clamping surface of table to lower end of ram guide	mm 600	23 5/8"
Maximum distance of tool to clamping surface of table	mm 975	38 3/4"
Cross adjustment	mm 10	3/8"
Number of speeds	6	6
Maximum safe cutting speed	m/min 90	132'
Number of strokes per minute	11-56	11-56
Maximum pulling power	kg 2500	5500 lbs
Feeds: continuous longitudinal feed ranging from	mm 0.2-2	0.008"-0.08"
continuous cross feed ranging from	mm 0.2-2	0.008"-0.08"
Main drive motor: Speed	r. p. m. 1400	1160
Output	HP 15	25
Rapid traverse motor: Speed	r. p. m. 1100	1100
Output	HP 1.5	1.5
Coolant pump motor: Speed	r. p. m. 2800	2800
Output	HP 0.15	0.15
Quantity supplied	l/min 15	3.3 gal/min
Floor space required (width X length)	mm 2800 X 2820	82" X 111"
Weight of machine with standard equipment	kg 7100	15,700 lbs
Weight of machine with packing	kg 7800	16,900 lbs
Weight of machine with seaworthy packing	kg 8300	18,300 lbs
Contents boxed	m ³ 21	744 cu. ft.

IN ORDERING SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY:

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.



STROJEXPORT - PRAHA - CZECHOSLOVAKIA

TYPE

HOV²⁵

SLOTING MACHINE

The machine is intended for the machining of flat as well as circular surfaces and may be used to advantage for individual manufacture as well as for mass production. It is suitable for smaller workshops and also for medium size plants. Outstanding features: high output, high precision, clean work, simple operation.

DESCRIPTION:

The column is of a sturdy design, adequately reinforced with ribs and consists of two parts, the wide opening of the machine makes it suitable for the machining of objects of the most varied shapes.

The machine is driven by a flange-mounted electric motor through a multi-plate clutch and brake fitted in the column from which the movement is transmitted through gears to a slide. The engagement of the required number of up-and-down strokes per minute is set by means of a selector drum controlled by a lever arranged at the right hand side of the column. The machine is started or stopped by means of the multi-plate clutch or brake which enables the ram to be stopped in any position. It has eight speeds arranged in a geometric progression with a coefficient of 1.25.

The ram has a high cross section with flat guideways. The ram head can be tilted as much as 10°. The tool holder is provided with a tool lifter. The ram is driven by a slide.

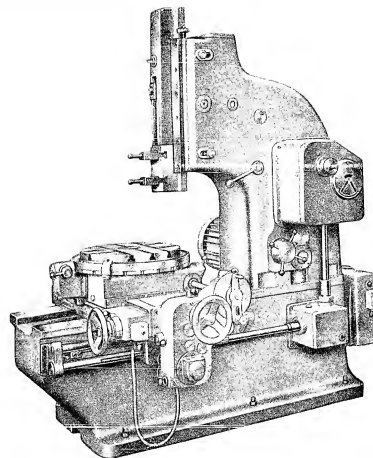
The feed assembly is arranged at the front of the column. The feed is continuous and may be adjusted within a range of 0.2 to 1.6 mm (0.080" to 0.640") per double stroke. There is a dial on the feed box indicating the rate of feed and also the cutting speed corresponding to any given number of double strokes per minute and magnitude of stroke.

The table is circular and provided with T-slots. It is divided at its circumference into 360 divisions. In the centre of the table there is a tapered hole for a pin which may be used for centering when machining circular surfaces. A special dividing attachment for indirect indexing is provided for the accurate setting of any number of divisions. In addition to that there is a direct indexing arrangement on which divisions to 2, 3, 4, 6, 8, 12 and 24 parts may be made.

The table has a longitudinal, cross and circular feed, hand driven as well as automatic. It is protected against overload by a safety clutch. The table can be moved rapidly in any direction by means of a rapid travel. The rapid travel is driven by an independent electric motor. The longitudinal and cross feeds may be limited by stops.

The drive and ram are centrally lubricated. The oil pump supplies oil through an oil filter into a tank from which it is distributed to the various lubricating points. The correct function of the lubricating system may be watched in a sight glass.

The electrical equipment is centralised in a sheet iron box on the right-hand side of the machine.



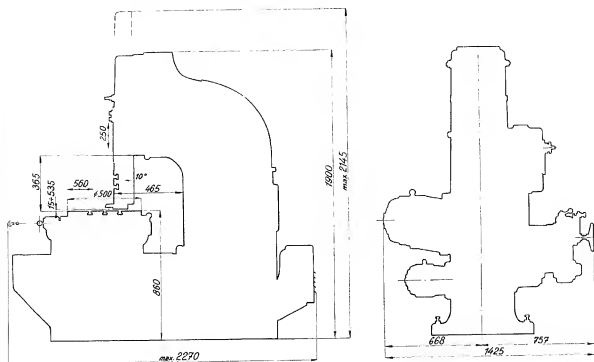
SPECIFICATION

25

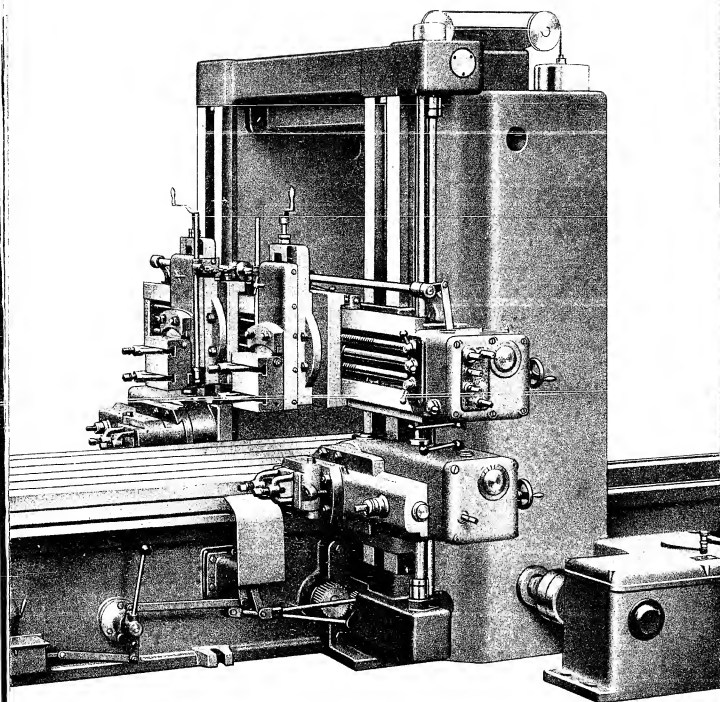
Stroke	mm	250	9 27/32"	Number of double strokes of ram per minute	22 to 112
Diameter of circular table	mm	500	20"	Feeds:	
Width and pitch of T-slots	mm	18 x 95	45 64" x 3 4"	Maximum pulling power	kg 1000 2200 lbs
Transverse movement of table	mm	450	18"	Range of continuous longitudinal feeds	mm 0.2 to 1.6 0.080" to 0.640"
Longitudinal movement of table	mm	560	22"	Range of continuous cross feeds	mm 0.2 to 1.6 0.080" to 0.640"
Adjustment of ram	mm	250	10"	Main driving motor:	
Distance, sealing surface of tool to column	mm	465	18"	Speed	r. p. m. 940
Distance, sealing surface of tool to ram guide	mm	135	5 5/16"	Output	HP 6.1
Distance, clamping surface of table to lower end of ram guide	mm	365	14"	Motor for rapid travel:	
Maximum distance, tool to clamping surface of table	mm	535	21"	Speed	r. p. m. 1400
Transverse swivel of ram		10°		Output	HP 11
Number of speeds		8		Floor space (width by length)	mm 1425 x 2270 56" x 89"
Maximum permissible cutting speed	m min.	35	117 f/min	Weight	kg 2850 6280 lbs
				Contents boxed	m ³ 7.3 cu ft 260
				Dimension of packing case (width x length x height)	mm 1500 x 2250 x 2190 59" x 89" x 85"

THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS HAS TO BE STATED IN THE ORDER.

The machines are continuously being improved upon. The data given in this pamphlet are therefore not binding in detail.



STADJEXPORT PRAHA - CZECHOSLOVAKIA



DOUBLE-HOUSING PLANING MACHINE

The machine is marked by its rigid construction and ensures a high quality of surface finish even at the heaviest planing operations.

Its high output enables economical machining and full utilization of cemented carbide tipped tools.

12

OUTSTANDING FEATURES

1. Wide range of planing and grinding speeds. Total number of cutting speeds 9, return speeds 6. Range of cutting speeds 5 to 28 metres per min. (16' to 92' per min.), range of return speeds 5 to 35 metres per min. (16' to 115' per min.).
3 speeds are available for grinding, i. e. 5, 9 and 11 metres per min. (16' 29' and 36' per min.). They are identical with 3 of the return speeds.
2. Drawing force of 8500 kg (18700 lbs) at motor output of 25 HP.
3. Reinforced side housings, deepened top cross member, crossrail of higher cross section and strengthened clamping of crossrail.
4. Flexible coupling between bed and gear box eliminates vibrations.
5. Pressures produced by machining operation are borne at tool box by sturdy sections.
6. Special arrangement for securing tool heads and slides in position eliminates vibrations of tool boxes.
7. Strengthened supports of tool boxes.
8. Lifting of tool box is possible even when slide is tilted considerably in relation to tool head.
9. Tools are clamped between hardened and grooved jaws.
10. Reduced impacts of power feed, improved safety clutches of feed and rapid traverse drive.
11. Rigidity of whole machine, increased cutting speeds and drawing force and high grade workmanship permit full utilization of cemented carbide tipped tools.

SPECIFICATION

Planing width	mm	1250	49"
Planing length	metres	3, 4, 5, 6	9'10", 13'1", 16'4", 19'8"
Planing height	mm	1100	43"
Clamping surface of table (width×length)	mm×m	1050×3, 4, 5, 6	35"×9'10", 13'1", 16'4", 19'8"
Width of distance of T-slots of table	mm	28×190	1 3/32"×7 15/32"
Horizontal movement of railheads	mm	1250	49 1/2"
Vertical movement of tool slides	mm	250	9 27/32"
Vertical movement of sidehead	mm	900	35"
Maximum cutting resistance	kg	8500	18700 lbs
Maximum load of table:			
per metre of planing length	kg	1500	
per foot of planing length	lbs	1010	
Number of cutting speeds		9	
Range of cutting speeds	metres per min.	5 to 28	16' to 92' per min.
Number of return speeds		6	
Range of return speeds	metres per min.	5 to 35	16' to 115' per min.
Speed of table for grinding in both directions	metres per min.	5, 9, 11	16', 29', 36' per min.
Range of tool head feeds	mm per stroke	0.3 to 6	0.012" to 0.240" per stroke
Range of tool slide feeds	mm per stroke	0.18 to 3.6	0.007" to 0.144" per stroke
Range of sidehead feeds, downward only	mm per stroke	0.3 to 4	0.012" to 0.160" per stroke
Speed of driving motor	r. p. m.	940	
Speed of motor for rapid traverse	r. p. m.	1400	
Output of driving motor	HP	25	
Output of motor for rapid traverse	HP	3	
The data below apply to maximum length of			
table of	mm	6000	19'8"
Floor space of machine (length×width)	mm	13440×3350	44'×11'
Weight of machine with standard equipment	kg	29000	63900 lbs
Shipping weight of machine, railway packing	kg	29500	65000 lbs
Shipping weight of machine, seaworthy packing	kg	33300	73400 lbs
Volume of boxes	cubic metres	41	1450 cu. ft.
Weight per metre (3'4") of planing length	kg	2600	5700 lbs

DESCRIPTION

THE BED has the shape of a sturdy and rigid box. Densely spaced ribs and thick walls brace the bed against all stresses and vibrations produced by the full load of the bed. On the central part of the bed bosses are arranged for the fitting of the housings. The bed rests on the foundation on its entire length. Double prismatic guideways ensure an accuracy in both directions lasting for many years even under the most difficult operating conditions.

THE TABLE has a high cross section and is provided with heavy longitudinal and traverse ribs so that it forms a rigid unit even when the length is considerable. The clamping surface of the table has a heavy allowance for wear and can therefore be repeatedly re-planed when worn. The deep T-slots afford solid clamping. An odd number of slots was chosen for jigs and special clamping fixtures. The table is provided at either end with cast iron pockets to protect the guideways from the chips. When high parts are being planed the cast iron pockets can be extended by means of sheet metal extensions.

THE HOUSINGS are box shaped and provided with densely spaced ribs. Joined to the bed and to the top cross member they form a firm and rigid unit.

THE FEEDS of all the tool heads and the lifting of the railhead tool boxes are actuated by the movement of the table by means of feed cogs. The drive of the feeds as well as of the tool lifters is protected against overload by a safety clutch.

THE TOOL BOX PIN on which the tool box swivels for the return movement of the table is relieved of the impacts and stresses produced when the tool strikes the workpiece during the cutting movement. The pin is not subjected to any wear and the tool box operates with a minimum of play. The tool does not bounce when striking the workpiece, the life of the cutting edge is longer and the quality of the machined surface is better. The tool, which is subjected to impacts and to heavy stresses, is clamped between grooved and hardened jaws. The tool box is provided with an automatic tool lifter. This tool lifter is equally effective even when the box is tilted considerably in relation to the tool head. The tool lifter can be put out of operation easily for inside planing.

THE TOOL SLIDE is secured in its position by means of a tapered gib. The gib forces the tool slide into the prismatic guideways on their entire length. This arrangement makes the tool slide capable of withstanding heavy pressures in all directions and the pressures are transmitted to the crossrail without play. The tool slide has to be secured in its position as this eliminates the play between the nut and screw and the tool, particularly if it is cemented carbide tipped, has a longer life. The tool slide, which can be tilted 65° in either direction, is attached to the railhead by means of 4 screws. For an accurate approach of the tool to the workpiece the screw of the slide has a square extension which can be turned by means of a hand crank.

THE CLAMPING OF THE CROSSRAIL is of particularly sturdy design and the clamped crossrail forms, together with the housings, a powerful carrier. The crossrail itself is exceptionally deep, of generous dimensions and reinforced with a large number of ribs. The shape of the crossrail has been selected to withstand the combined stresses produced by the machining operation. The clamping mechanism ensures uniform clamping of the crossrail to both housings. The motor of the rapid traverse is

fitted in the top cross member. The movement is transmitted to the drive shafts by worm gears enclosed in boxes with an oil bath. The right hand rapid traverse shaft passes through the feed box of the crossrail and the feed box of the right hand sidehead. The left hand rapid traverse shaft passes through the feed box of the left hand sidehead. In case of unequal wear of the screws or nuts the crossrail is adjusted to a horizontal position by turning the adjusting nuts on the screws.

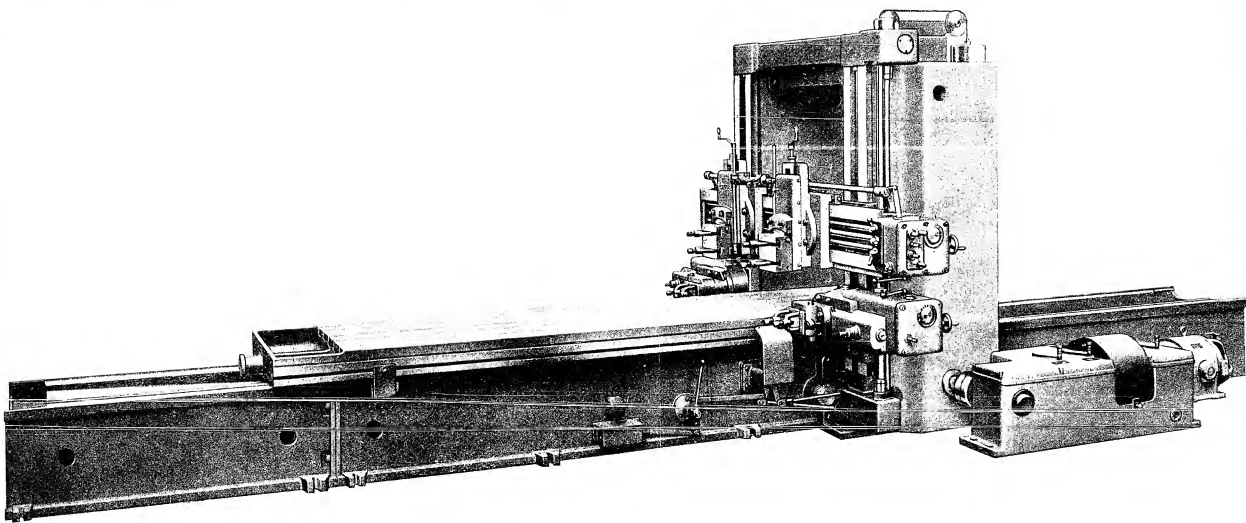
THE FEED AND RAPID TRAVERSE of both railheads are engaged from the feed box on the crossrail. Each railhead has its own screw for the horizontal movement and there is a common shaft for the vertical movement. The direction of feed or rapid traverse is engaged by the appropriate lever on the feed box. The vertical movement of the railheads is engaged directly on each railhead. The rapid traverse is engaged by means of a dog coupling which is so designed that it disengages itself automatically as soon as the operator releases the control lever. The feed is varied by means of a hand wheel and the rate of feed is read on a scale.

THE SIDEHEADS are independent of the railheads. They have their own feed boxes. Both sideheads are balanced by counterweights for easier movement by hand or power. This also reduces the wear of the nuts of the vertical screws. Each sidehead is controlled from the feed box on the sidehead. The feed and rapid traverse are independent of the railheads. The tool slide of the sidehead is secured in its position by means of a tapered gib. The gib forces the tool slide into the prismatic guideways on its entire length. This arrangement makes the tool slide capable of withstanding heavy pressures in all directions and the pressures are transmitted to the housing without play. The tool slide, which can be tilted 60° in either direction, is attached to the sidehead by means of 4 screws. The pin on which the tool box swivels for the return movement of the table is relieved of the impacts and stresses produced when the tool strikes the workpiece. The pin is not subjected to wear and maintains the accuracy of the tool box even under the heaviest loads of the sidehead. The tool does not bounce when striking the workpiece, the cutting edge has a longer life and the quality of the machined surface is better. The tool is clamped between grooved and hardened jaws.

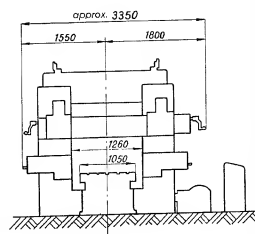
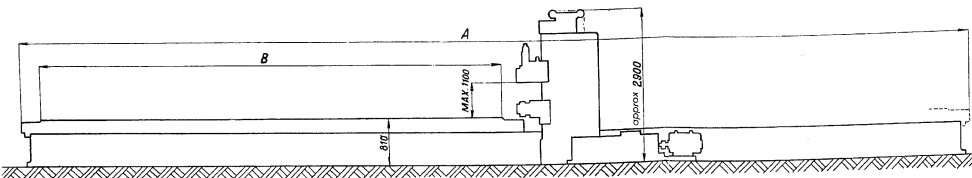
THE TABLE is driven by an A. C. motor through an electromagnetic reversing clutch fitted in an independent gear box. The gear box is coupled with the gear in the bed through a flexible coupling. The motor is likewise coupled to the gear box through a flexible coupling. The cutting and return speeds are engaged by means of levers on the gear box. The electromagnetic clutch reverses the table quickly, reliably and with the smallest possible current surges.

The gear in the bed runs in sturdy plain bearings. Helical teeth of the entire set of gears ensure quiet operation. The movement of the table is controlled by hand by a lever on the bed at the operator's post or automatically by stops of the table which engage or disengage one or the other half of the electromagnetic clutch.

THE LUBRICATION of the guideways of the table and bed is automatic, circulating. The pump is of the piston type and driven by an eccentric on a shaft in the drive. The piston of the pump is continuously being pressed against the eccentric by a spring. The oil supplied by the pump lubricates the guideways and all bearings of the drive shafts. The gear is partly submerged in an oil bath. Excess oil from the guideways and from the rack returns through screens and filters to the central part of the bed where the lubricating oil pump is located. A grinding head can also be supplied for the machine to be fitted to the slide of a railhead.



A mm	7440	9440	11440	13440
B mm	3000	4000	5000	6000



STANDARD EQUIPMENT:

Two rail heads
Right-hand side head
Left-hand side head
Tool-holders
Electrical equipment with electromagnetic clutch
Main drive motor with flexible clutch
Rapid traverse motor with pulley and V-belts
Set of spanners and operating tables
Operator's instruction booklet

OPTIONAL EQUIPMENT:

Grinding attachment

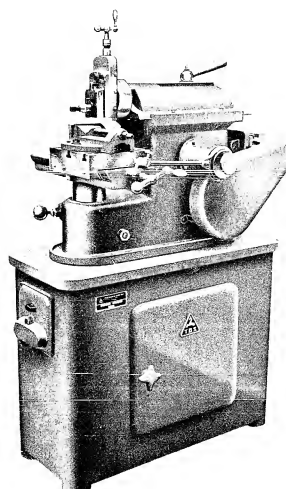
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STROJEXPORT - PRAHA - CZECHOSLOVAKIA

BENCH SHAPER MODEL

STAT
40
20



This machine is an ideal tool-room shaper suitable for machining smaller parts and for all jobs where hand filing should be replaced by machining.

THE RAM slides in adjustable V-guides. Its cutting stroke and rapid return are controlled by a link mechanism. Changing of the stroke is very smooth and can be done with the machine in motion if desired. The ram is adjusted by hand after loosening the ram clamp at the top of the machine.

The swivelling tool head carrying the tool slide with the single post type tool-box is adjusted for angular cutting on a direct reading dial. At the return stroke the toolbox is automatically swung and lifted. The tool slide is fed into the cut by a handcrank provided with a dial.

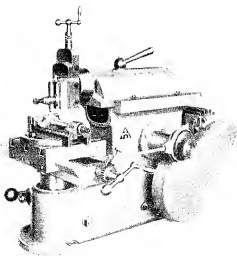
THE TABLE is cross adjustable in V-guides. Its cross feed is accomplished by means of a handcrank or automatically by a draw-rod and ratchet, the feed rate being readily adjusted. The table is locked in its vertical position by clamping the column sleeve. Three T-slots for clamping the work or a vice are provided on the working surface of the table.

THE GEARBOX is incorporated in the machine base. The gear mechanism is driven by V-belts from an electric motor. Two speeds are changed by shifting a handlever.

THE BENCH is a very rigid steel cabinet supplied as optional equipment at an extra charge. For the bench no foundation is necessary so that it can easily be removed anywhere to suit the job requirements. The machine is fixed to the bench by 4 bolts. The bench contains the electric switch with fuses and may also be used for keeping in the tools and equipment.

STANDARD EQUIPMENT: Electric motor, 3 V-belts, swivel vice, operating instruction booklet.



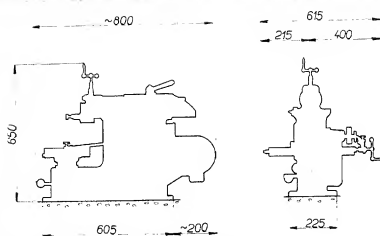


SPECIFICATIONS:

Length of stroke	mm 200	7 7/8"
Working surface of table	mm 200X200	7 7/8"X7 7/8"
Vertical adjustment of table	mm 110	4 1/16"
Cross adjustment of table	mm 210	8 1/4"
Vertical adjustment of tool slide	mm 70	2 3/4"
Maximum distance, table to tool slide	mm 140	5 1/2"
Number of cutting speeds	2	2
Number of strokes per min.	52 and 78	52 and 78
Automatic cross feed of table per 1 stroke	mm 0,13 0,26 0,4	0,005" 0,01" 0,016"
Motor:		
Speed r. p. m.	1000	1000
Output HP	0,68	0,68
Floor space required	mm 615X800	24 1/4"X31 1/2"
Weight of machine:		
with standard equipment	kg 136	lbs 300
with packing	kg 160	lbs 350
with seaworthy packing	kg 182	lbs 400
Contents boxed	m ³ 0,4	cu. ft. 14

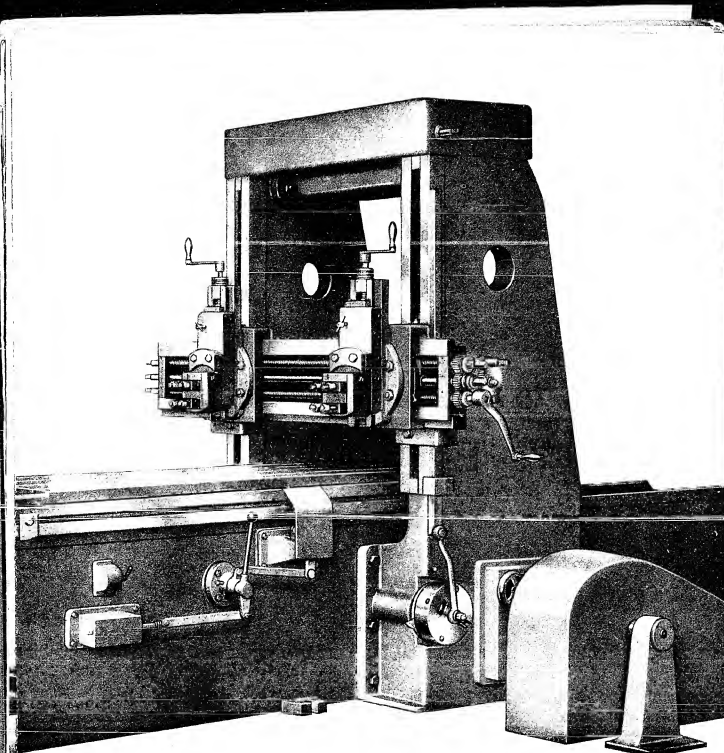
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STROJEXPORT PRAHA - CZECHOSLOVAKIA

Printed in Czechoslovakia
2007-01-15/1500 2500 3000



DOUBLE HOUSING PLANING MACHINE TYPE

Heavy Duty Precision Machine the sturdy construction of which ensures first class quality of the surface finish.

The high capacity of this machine makes it equally well suited for the single part and mass production.

A

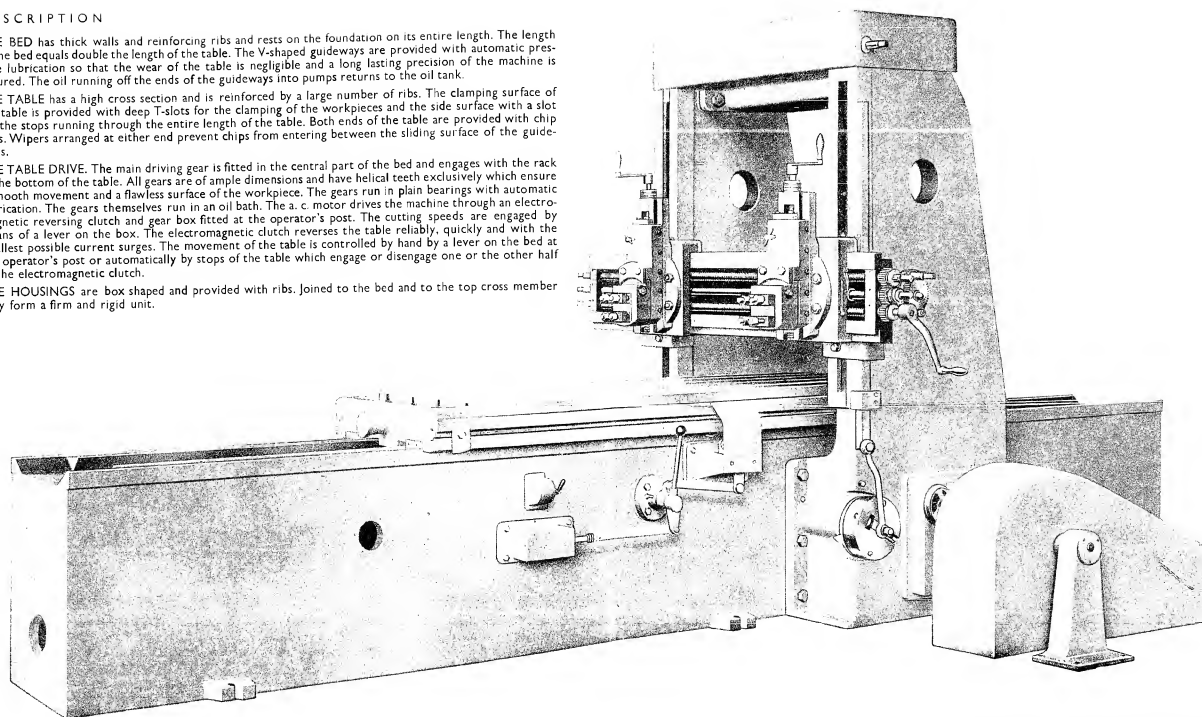
DESCRIPTION

THE BED has thick walls and reinforcing ribs and rests on the foundation on its entire length. The length of the bed equals double the length of the table. The V-shaped guideways are provided with automatic pressure lubrication so that the wear of the table is negligible and a long lasting precision of the machine is ensured. The oil running off the ends of the guideways into pumps returns to the oil tank.

THE TABLE has a high cross section and is reinforced by a large number of ribs. The clamping surface of the table is provided with deep T-slots for the clamping of the workpieces and the side surface with a slot for the stops running through the entire length of the table. Both ends of the table are provided with chip pans. Wipers arranged at either end prevent chips from entering between the sliding surface of the guideways.

THE TABLE DRIVE. The main driving gear is fitted in the central part of the bed and engages with the rack at the bottom of the table. All gears are of ample dimensions and have helical teeth exclusively which ensure a smooth movement and a flawless surface of the workpiece. The gears run in plain bearings with automatic lubrication. The gears themselves run in an oil bath. The a. c. motor drives the machine through an electromagnetic reversing clutch and gear box fitted at the operator's post. The cutting speeds are engaged by means of a lever on the box. The electromagnetic clutch reverses the table reliably, quickly and with the smallest possible current surges. The movement of the table is controlled by hand by a lever on the bed at the operator's post or automatically by stops of the table which engage or disengage one or the other half of the electromagnetic clutch.

THE HOUSINGS are box shaped and provided with ribs. Joined to the bed and to the top cross member they form a firm and rigid unit.



THE CROSSRAIL is of generous dimensions and reinforced with a large number of ribs. Its shape has been selected to withstand the combined stresses produced by the machining operation. The crossrail is raised by hand from the operator's post. The levelling of the cross rail is done by a disc coupling in the top cross member which is easily accessible.

THE RAILHEADS. The machine is provided with two railheads fitted with tool slides which can be tilted 50° in either direction and are attached to the railheads by means of 4 screws.

The tool slide is secured in its position by means of a tapered gib. The gib forces the tool slide into the prismatic guideways on its entire length. For an accurate approach of the tool to the workpiece the screw of the tool slide has a square extension which can be turned by means of a handcrank. The feed is either mechanical by means of the feed drive arranged at the operator's post, or manual. Each railhead has its own screw

for the horizontal movement and there is a common shaft for the vertical movement. The mechanical vertical feed of each railhead can be engaged or disengaged independently by means of levers arranged on each railhead. The railheads can be controlled from either side of the machine. The railheads are clamped to the crossrail by means of a handle arranged on each railhead. The rate of feed is set on a disc at the operator's post.

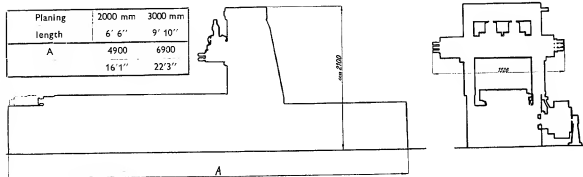
THE LUBRICATION of the guideways of the bed is automatic. The oil pump is of the piston type and driven by an eccentric on a shaft in the drive. The piston of the pump is continuously being pressed against the eccentric by a spring. The oil supplied by the pump lubricates the guideways and all bearings of the drive shafts. The gears in the bed and gear box run in an oil bath.

STANDARD EQUIPMENT 2 railheads • Toolholders • Electrical equipment including electromagnetic clutch and pulley • Main drive motor including pulley and V-belt • Set of spanners and operating plates • Operating instruction booklet.

SPECIFICATION

Planing width	mm	850		33"	
Planing length	mm	2000	3000	6' 6"	9' 10"
Planing height	mm	780		30"	
Clamping surface of table (width x length)	mm	685 2030	685 3030	2' 3" 6' 7"	2' 3" 9' 11"
Width and distance between T-slots	mm	20 170		25 32"	6 11 16"
Movement of tool slide	mm	220		8 21 32"	
Cutting speed	metres per min.	11—16—22		36'—52'—72'	per min.
Return speed	metres per min.	28		92'	per min.
Cross feed	mm per stroke	0.3 to 3		0.012" to 0.120"	per stroke
Tool slide feed	mm per stroke	0.3 to 2.7		0.012" to 0.108"	per stroke
Input power of motor	HP	10			
Speed of motor	r. p. m.	940			
Weight of machine with standard equipment	kg	4800	6000	10600 lbs	13200 lbs
Weight of machine with seaworthy packing	kg	6200	7650	13600 lbs	16800 lbs
Contents boxed	m ³	12	14.5	430 cu. ft.	520 cu. ft.

Planing length	2000 mm	3000 mm
length	6' 6"	9' 10"
A	4900	6900
	16' 1"	22' 3"



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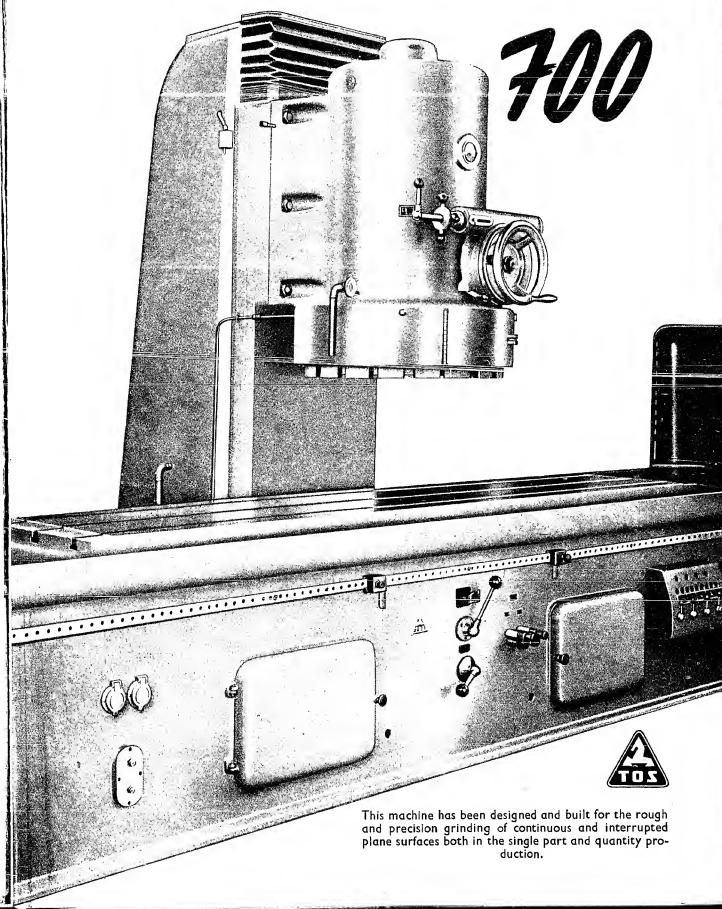
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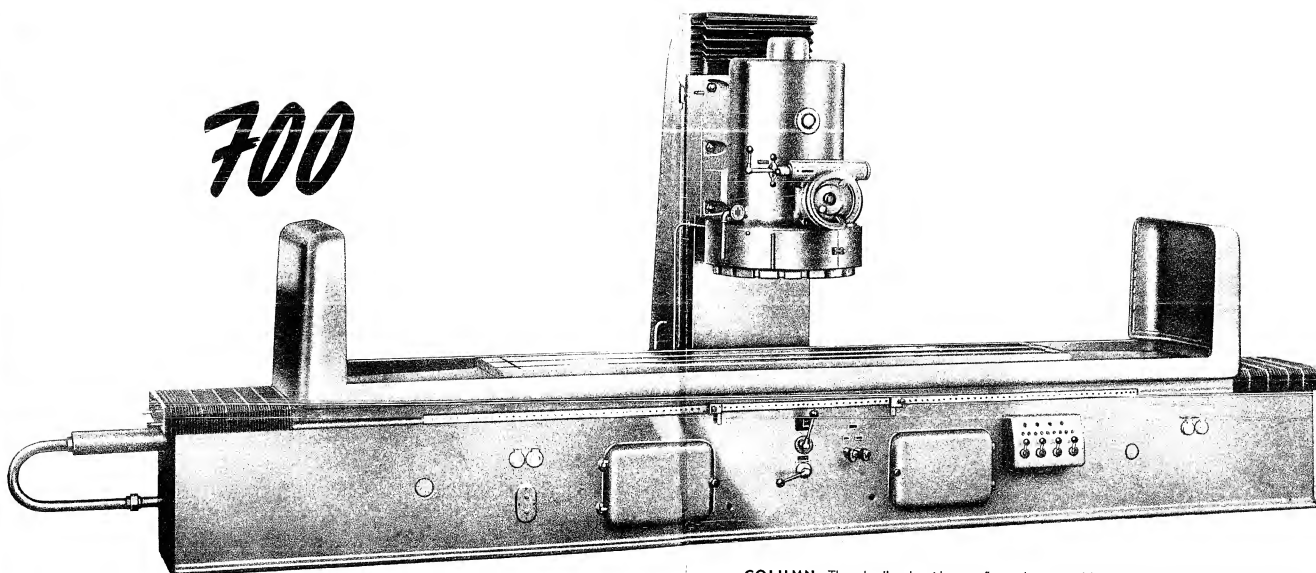
VERTICAL SURFACE GRINDER MODEL

STAT

700



This machine has been designed and built for the rough and precision grinding of continuous and interrupted plane surfaces both in the single part and quantity production.



WHEELHEAD. The wheelhead is vertically adjustable on flat guideways. A built-in dynamically balanced motor drives the wheel spindle. The vertical rapid travel of wheelhead is by power. For concave grinding the wheelhead may be slightly swung out of its vertical position. In its upper position the wheelhead is secured by a limit switch.

The wheel spindle is fed into the cut micrometrically by hand or hydraulically in each table reversal. For precision grinding with power feed the stop dog can be adjusted by means of a handwheel with dial. The segmental grinding wheel is carefully balanced.

TABLE. The working surface of table is arranged for clamping directly the work or an electromagnetic chuck which is used in mass production. The table travel is hydraulic and may be limited by adjustable stops.

BED. The flat and V-guides of the bed have automatic pressure lubrication and are protected by dust guards attached to the table.

COLUMN. The wheelhead guides are flat and protected by guards against the entrance of foreign matter. In the lower part of the column are incorporated the oil tank for the hydraulic system, the coolant pump and the electrical equipment. The wheelhead ways are lubricated by pressure oil.

COOLING SYSTEM. The coolant is supplied by an electric pump from the coolant tank inside the column.

ELECTRICAL EQUIPMENT. It consists of the wheel spindle motor, hydraulic pump motor, coolant pump motor, motor for the vertical travel of wheel head, and of protecting contactors remote controlled by push-buttons.

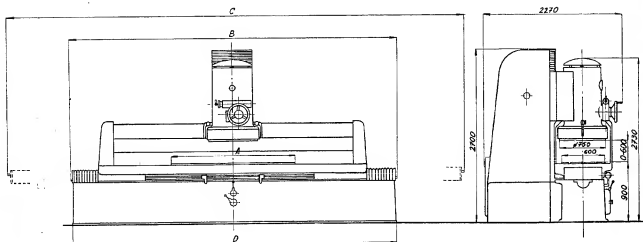
STANDARD EQUIPMENT: Wheel spindle motor, motor for the vertical travel of wheelhead, hydraulic pump motor, coolant pump motor, electrical installation and equipment, set of grinding segments, plain wheel dresser, gauge for the vertical setting of grinding segments, cooling attachments, grease gun, standard and special spanners, demagnetising switch for the electromagnetic chuck, operating instruction booklet.

OPTIONAL EQUIPMENT: Electromagnetic chuck, current rectifier to suit 220 volts/110 volts.

SPECIFICATION BPV 700

700

Working surface of table	mm	600x1500	600x3000	23.6" x 59"	23.6" x 118"
Maximum width ground	mm	700	700	27.6"	27.6"
Maximum distance, face of grinding wheel to table surface	mm	600	600	23.6"	23.6"
Outer diameter of grinding wheel	mm	750	750	29.5"	29.5"
Longitudinal travel of table	mm	2420	3920	95"	154"
Speed of longitudinal table travel (infinitely variable)	m/min.	1-12	1-12	39.4"-472" p. min.	39.4"-472" p. min.
Automatic vertical feed of wheelhead in table reversal, ranging from	mm	0.004-0.1	0.004-0.1	.00016"- .004"	.00016"- .004"
Speed of power vertical travel of wheel head	m/min.	0.6	0.6	23.6" p. min.	23.6" p. min.
Wheel spindle motor:	R. P. M.	575	575	575	575
	HP	30	30	30	30
Motor for vertical travel of wheelhead:	R. P. M.	2800	2800	2800	2800
	HP	2.7	2.7	2.7	2.7
Hydraulic pump motor:	R. P. M.	1420	1420	1420	1420
	HP	5.5	5.5	5.5	5.5
Floor space required	mm	2275 x 6550	2275 x 10,020	90" x 270"	90" x 393"
Weight of machine: with standard equipment	kg	11,000	13,000	24,300 lbs.	28,800 lbs.
with packing	kg	11,900	14,200	26,300 lbs.	31,300 lbs.
with seawayorthy packing	kg	12,200	14,800	27,000 lbs.	32,700 lbs.



Type	A	B	C	D
BPV 700x1500	1500	4700	6850	4550
BPV 700x3000	3000	6550	10020	6400

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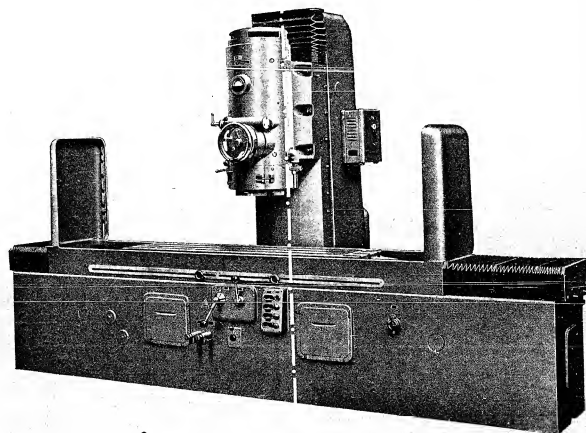
KOVO * PRAHA * CZECHOSLOVAKIA

VERTICAL SURFACE GRINDING MACHINE

TYPE

STAT

BPV 3000



PODHAJSKÝ



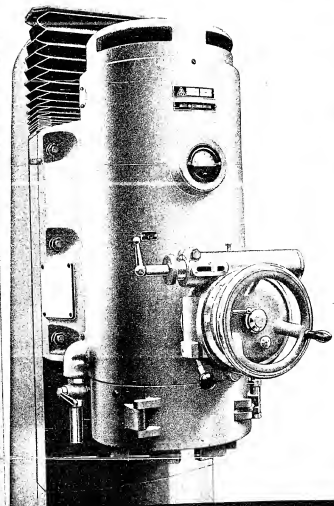
**VERTICAL
SURFACE GRINDING MACHINE**
type

IBPV-300

A heavy duty precision machine with hydraulic table feed and hydraulic movement of the wheel head for coarse grinding of continuous or interrupted plane surfaces.

Manufactured in two designs one of which has a table with a clamping surface 1,000 mm (3' 3") long, the other 1,500 mm (4' 11").

During grinding the entire working width of the table or of the surface of the electromagnetic chuck can be covered simultaneously by a sector type grinding wheel.



DESCRIPTION

THE WHEEL HEAD

has flat guideways and is adjustable for height. The rapid traverse is power operated being driven by an independent electric motor and controlled by two push-buttons, one for each direction. The raising or lowering of the head continues as long as the corresponding push-button is being held depressed. The upper extreme position of the wheel head is safeguarded by a limit switch which stops the motor automatically even while the push-button is depressed. The movement of the wheel head into the cut is automatic, operated hydraulically as well as by hand. The automatic feed operates in each dead centre of the table. The depth of the layer removed by grinding may be observed on the dial of the hand wheel. The total depth of grinding can be set in advance by means of a stop so that the automatic feed is disengaged automatically as soon as the required depth is reached. The spindle is driven by a built-in dynamically balanced electric motor. The head can be slightly tilted out of its horizontal position for hollow grinding. A built-in ammeter indicates the load of the motor.

THE TABLE.

The working surface of the table is arranged for direct clamping of the work piece or of an electromagnetic chuck which is used for repetition work. The movement of the table is hydraulic. It is limited by adjustable stops.

THE BED.

The flat and prismatic guideways of the bed are force feed lubricated with oil. The guideways are protected against impurities and dust by covers attached to the table.

THE HOUSING.

The guideways of the wheel head are flat. The lower part of the housing contains the oil of the hydraulic equipment, the coolant pump and the electrical equipment.

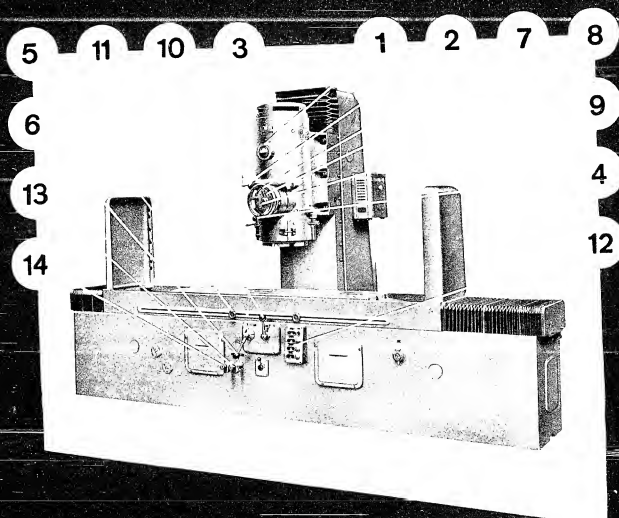
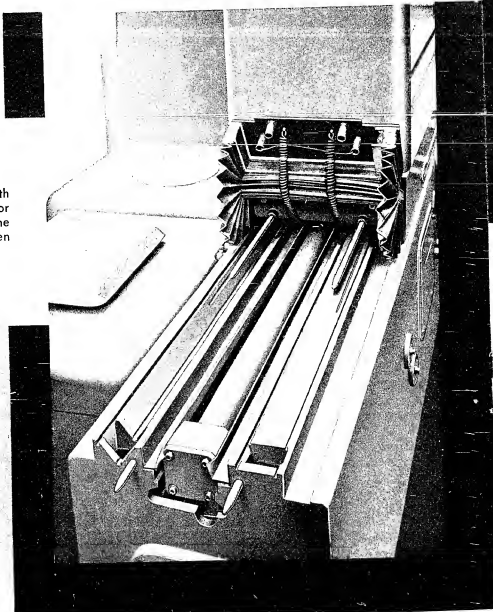
THE COOLING EQUIPMENT.

The coolant is supplied by an electric motor driven pump from a tank arranged next to the housing.

THE ELECTRICAL EQUIPMENT

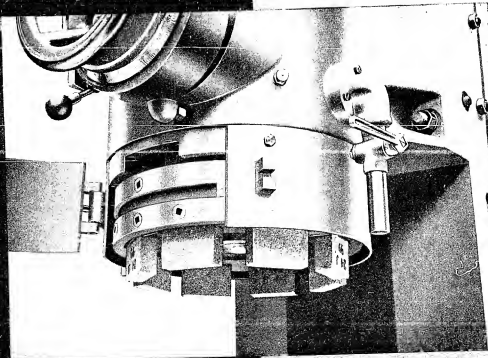
consists of the electric motors for the drive of the grinding wheel spindle, the hydraulic pump, the coolant pump and for the vertical movement of the wheel head as well as of the protective switches which are remote controlled by push-buttons.

View of Guideways of Bed with Guard Lifted. The cylinder for the hydraulic movement of the table is fitted in the bed between the guideways.



CONTROLS

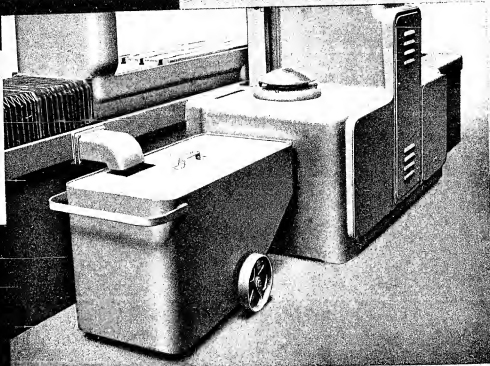
- | | |
|--|--|
| (1) Ammeter | (8) Wheel for Hand Movement of Wheel Head into Cut |
| (2) Adjusting Screw of Rate of Automatic Feed with Indicator | (9) Brake Head |
| (3) Lever of Automatic Movement of Wheel Head into Cut | (10) Coolant Cocks |
| (4) Lever of Hand Movement of Wheel Head into Cut | (11) Table Reversing Lever |
| (5) Adjustable Stops of Table | (12) Push-Button Box for Control of Contactors |
| (6) Speed Lever of Table | (13) Lubricating Valve of Table and Bed |
| (7) Crank for Firm Coupling of Rotary Scale with Hand Wheel | (14) Lubricating Valve of Various Surfaces of Wheel Head and Elevating Mechanism |



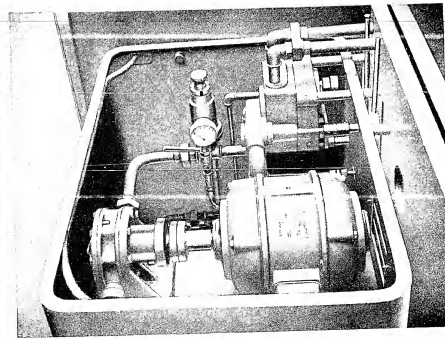
The sector type grinding wheel is fitted to the tapered end of the spindle. The grindstones are prismatic in shape and are inserted by means of a template supplied for the purpose so that, after being dressed, all grindstones are of equal height and the grinding wheel need not be balanced.

BPV-300

The coolant pump is separate from the machine proper and is provided with settling vessels for grinding dust and chips.



The hydraulic equipment with the oil pump, the motor and the distribution for the movement of the wheel head and the travel of the table is arranged in a separate tank set up next to the machine.



STANDARD EQUIPMENT

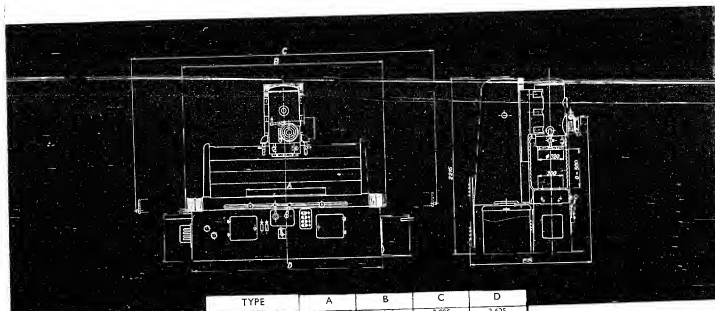
- Electric motor for drive of grinding wheel spindle
- Electric motor for vertical movement of wheel head
- Electric motor of pump of hydraulic system
- Electric motor of coolant pump
- Electric switchgear
- Set of grindstones
- Simple grindstone truing attachment
- Gauge for adjustment of height of grindstones
- Pressure lubricator
- Standard and special spanners
- De-magnetizing switch for electromagnetic chuck
- Operating instructions

OPTIONAL EQUIPMENT

- Electromagnetic chuck
- 300×1,500 mm (11³/₄"×59")
- for table 1,500 mm (59") long and
- 300×1,000 mm (11³/₄"×39³/₄")
- for table 1,000 mm (39³/₄") long
- Rectifier, 220 Volts a. c./
- 110 Volts d. c.

SPECIFICATION

Clamping surface of table	mm 300x1,000	mm 300 x 1,500
	117 1/2" x 39 1/4"	117 1/2" x 59"
Maximum grinding width	mm 300 117 1/2"	mm 300 117 1/2"
Maximum distance, face of grinding wheel to surface of table	mm 500 19 1/4"	mm 500 19 1/4"
Maximum diameter of grinding wheel	mm 320 12 1/2"	mm 320 12 1/2"
Longitudinal travel of table	mm 1,365 54 1/2"	mm 2,050 80 3/4"
Rate of longitudinal feed of table per minute, infinitely variable	metres 2 to 16 7" to 52"	metres 2 to 16 7" to 52"
Automatic vertical feed of wheel head in dead centre of table variable within range of	mm 0.004 to 0.1 0.0016" to 0.004"	mm 0.004 to 0.1 0.0016" to 0.004"
Rate of rapid power traverse of wheel head per minute	metres 0.825 32 1/2"	metres 0.825 32 1/2"
Motor for grinding wheel spindle drive:		
speed	r. p. m. 1,440	r. p. m. 1,440
power	HP 20	HP 20
Motor for vertical movement of wheel head:		
speed	r. p. m. 2,800	r. p. m. 2,800
power	HP 1.3	HP 1.3
Motor of pump for hydraulic system:		
speed	r. p. m. 1,420	r. p. m. 1,420
power	HP 3	HP 3
Floor space required by machine	mm 1,515x3,825 5' x 12' 7"	mm 1,515x5,480 5' x 18"
Weight of machine with standard equipment:		
net	kg 3,900 8,600 lbs	kg 4,500 9,920 lbs
shipping, ordinary packing	kg 4,200 9,260 lbs	kg 4,800 10,580 lbs
shipping, seaworthy packing	kg 5,000 11,020 lbs	kg 6,000 13,230 lbs



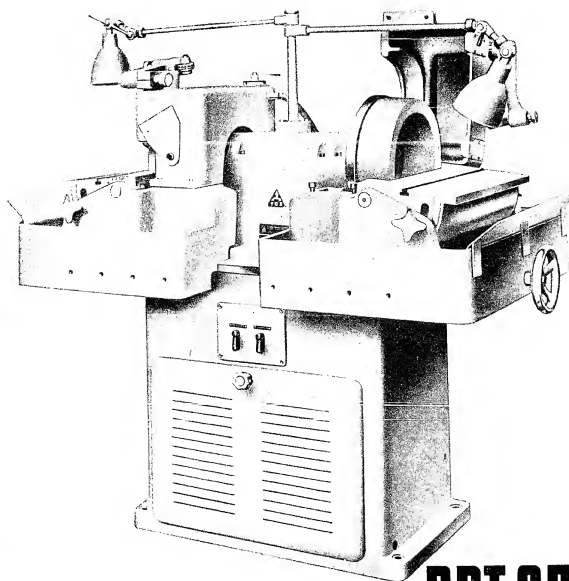
TYPE	A	B	C	D
BPV 300 1,000 mm	1,000	3,575	3,825	2,425
	3'6 3/8"	8'6"	12'6 1/2"	6'7 3/8"
BPV 300 1,500 mm	1,500	3,825	5,105	3,720
	4'11"	12'7 3/4"	17'1 3/4"	12'3 1/4"

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE
FOR THE ELECTRIC MOTORS

The machines are continuously being improved upon.
The data given in this prospectus are therefore not binding in detail.

STROJEXPORT
PRAHA — CZECHOSLOVAKIA

PODHAJSKÝ



DUPLEX-WHEEL TOOL GRINDER MODEL

BBT 350

This machine is especially effective for the sharpening of carbide-tipped tools. The sharpening operation is performed by the face of the straight cup wheel while the tool rests on an angularly adjustable tilting table.

THE SPINDLE rotates in precision anti-friction bearings and is driven by two V-belts from the electric motor located inside the column which also contains the coolant tank.

THE TABLES may be angularly adjusted $\pm 20^\circ$ C and moved by a handwheel in the direction of the center line of spindle. Graduations in degrees indicate the angular setting of the work tables.

THE WHEEL TRUEING DEVICES are mounted on the wheel guards. They may be swung down and are finely adjustable by a screw.

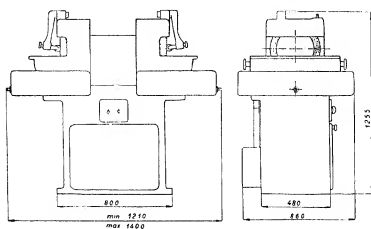
STANDARD EQUIPMENT: electric motor with electrical equipment, 2 grinding wheels, 2 wheel trueing devices, 2 spare wheel flanges, coolant pump, operating instruction booklets.



Dimensions of grinding wheels:		Metric	English
external diameter	mm	350	13 3/4"
internal diameter	mm	270	10 5/8"
width	mm	100 or 70	4 or 2 7/8"
Speed of grinding wheel	R. p. m.	1560	1560
Dimensions of table	mm	210 x 560	8 1/4" x 22"
Table travel by hand	mm	95	3 3/4"
Maximum angular setting of tilting tables		±20°	±20°
Electric motor: Speed	R. p. m.	1420	1420
Output	HP	2	2
Floor space required	mm	860 x 1420	34" x 56"
Weight of machine: with standard equipment	kg	820	1800 lbs.
with packing	kg	840	1860 lbs.
with seaworthy packing	kg	960	2120 lbs.
Contents boxed	m ³	2.25	80 cu. ft.
Size of case	cm	100 x 150 x 150	39 1/2" x 59 1/2" x 59"

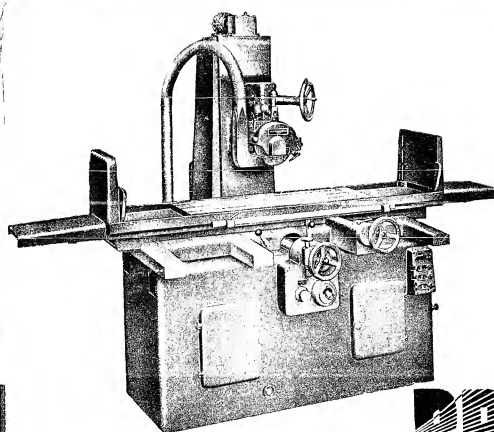
As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!



STROJEXPORT

PRAGA-CZECHOSLOVAKIA



BPH 300

HORIZONTAL SURFACE GRINDER Model BPH 300

This machine is designed for the precision grinding of plane surfaces, even longitudinally stepped, both in individual and quantity production.

THE WHEEL SPINDLE is mounted horizontally in adjustable sleeve bearings and vertically adjustable either by power, or micrometrically by hand. Automatic lubrication is provided. The power is transmitted by V-belts from the electric motor through two-step pulleys. By shifting the belt to the second step of the pulley the reduced peripheral speed of the partly worn grinding wheel is eliminated.

THE TABLE has V-guides at the front and flat ways at the rear. The longitudinal table movement is by hand or hydraulic, infinitely variable. The cross feed proceeds by hand or by power in both table reversals. The extreme positions are limited by electric switches.

THE BED is fitted with two Vee and flat ways for the table cross-feed and with a rear guide for the vertical adjustment of the wheel slide. The bed also contains the oil tank of the hydraulic equipment for the table movement.

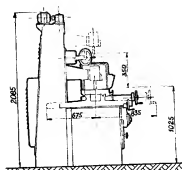
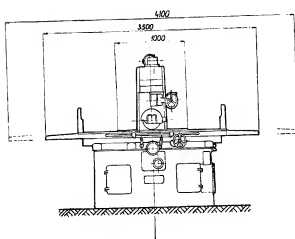
THE ELECTRICAL EQUIPMENT consists of electric motors with dynamically balanced rotors and protective contactors with remote push button control.

STANDARD EQUIPMENT: 3 electric motors with equipment, grinding wheel with balancing flange, balancing arbor, micrometer cross feed, demagnetizing switch for electromagnetic chuck, wheel truing device mounted on the table, set of spanners, operating instruction booklet.

WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

SPECIFICATION

		Metric	English
Working surface of table	mm	300 X 1000	11 3/4" X 39 1/2"
Dimensions of grinding wheel			
external diameter	mm	250	9 1/2"
internal diameter	mm	51	2"
width	mm	25	1"
Minimum diameter of grinding wheel	mm	110	4 1/4"
Longitudinal travel of table	mm	1060	42"
Cross travel of table	mm	350	13 3/4"
Vertical travel of headstock (without electromagnetic chuck at minimum dia. of grinding wheel)	mm	420	16 1/2"
Speed of longitudinal table motion (infinitely variable)	mm/min.	2-16	78-50" p.m.
Table cross feed ranging from	mm	0.1-2	0.004-0.08"
Vertical feed into the cut per 1 division on the indexing ring	mm	0.01	0.0004"
Motor for spindle drive	R.p.m.	2800	2800
	HP	2.2	2.2
Motor for vertical motion of wheel head	R.p.m.	2770	2770
	HP	0.7	0.7
Motor for oil pump	R.p.m.	1400	1400
	HP	2.05	2.05
Floor space required	mm	1625 X 4100	65' X 161'
Weight of machine with:			
standard equipment	kg	3000	6600 lbs.
railway packing	kg	3350	7350 lbs.
seaworthy packing	kg	3700	8100 lbs.
Measurements of packing	m ³	12	425 cu. ft.



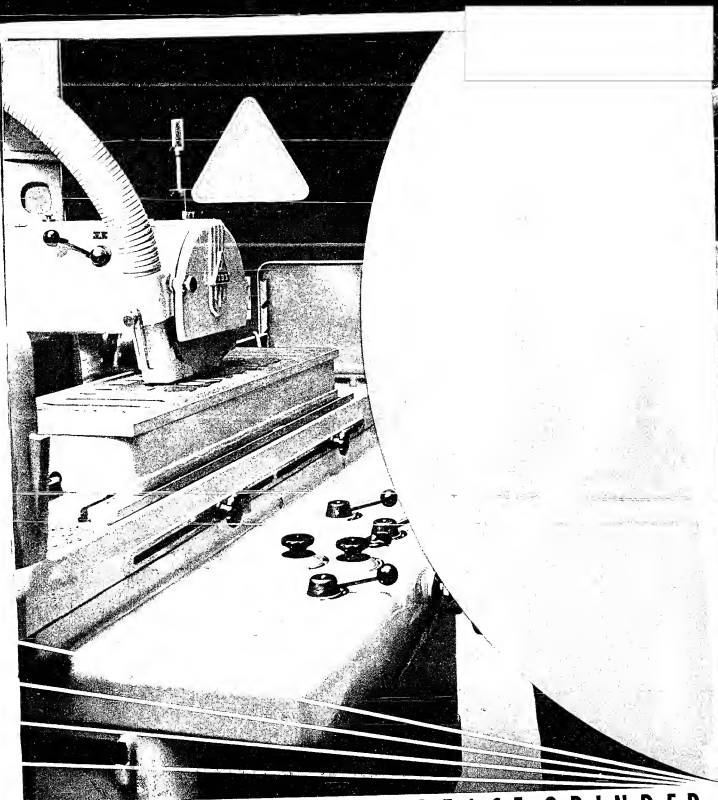
OPTIONAL EQUIPMENT: Dust exhaust attachment, cooling attachment, electromagnetic chuck, rectifier for electromagnetic chuck, balancing stand for grinding wheel, wheel truing device to be mounted on the wheel head, additional flange for grinding wheel.

As improvements in design are continually being made this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA - CZECHOSLOVAKIA

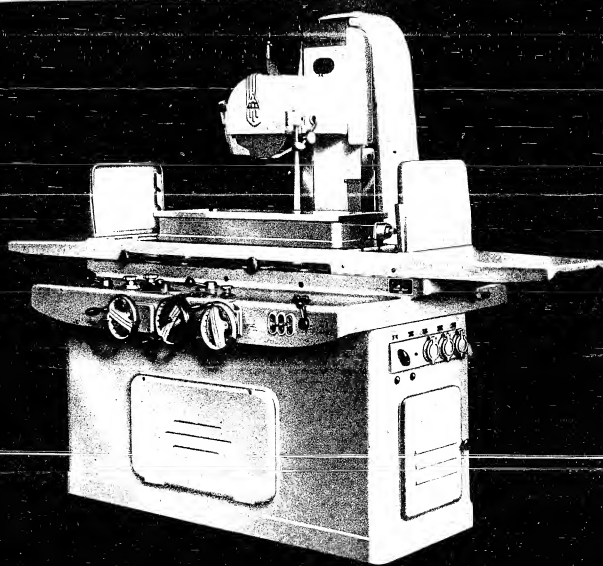
Printed in Czechoslovakia

COX 33801 a - 5502 - 561 04 - 14



TOS HORIZONTAL SURFACE GRINDER

BPH31



TOS HORIZONTAL SURFACE GRINDER

is designed for precision grinding of plane surfaces, even longitudinally stepped, and is equally adapted both to single part and quantity production, the automatic working cycle being controlled hydraulically.

THE WHEEL HEAD slides vertically in the column guides protected by a guard against the ingress of dust. The wheel spindle is mounted in adjustable plain bearings of new design (Czechoslovak patent) which eliminate the play to a minimum and ensure an efficient automatic lubrication and cooling. The spindle is driven by V-belts from an electric motor located in the lower part of the head. The vertical feed of the grinding wheel into the cut is done either by hand on a scale or automatically in each reversal of the cross slide. The wheel head is rapidly adjusted for height by an electric motor.

THE TABLE AND THE CROSS SLIDE move in covered pneumatic and flat guides. The table feed is either hydraulic, infinitely variable or by hand. The cross slide motion is effected hydraulically in one or in both table reversals independently of the table motion by infinitely variable speed. The cross slide can be adjusted by hand with the aid of a micrometer screw. The grinding width is limited by adjustable stops which automatically change the direction of the feed. The direction of the longitudinal and of the cross feed can also be changed by a hand lever.

THE AUTOMATIC WORKING CYCLE enables the grinding of mass-produced parts. The number of cross slide reversal, where the machine automatically stops, can be adjusted on a scale from 1 to 10. The vertical feed of the grinding wheel into the cut in each cross slide reversal ranges from 0 to 0.07 mm. The total feed into the cut can be adjusted on the hand wheel dial for the vertical feed into the cut in accordance with the machining allowance. Thus by the selection of the vertical feed in the cross slide reversals and by the selection of the number of reversals the number of sparking out strokes of the cross slide can be found, after which the table automatically stops.

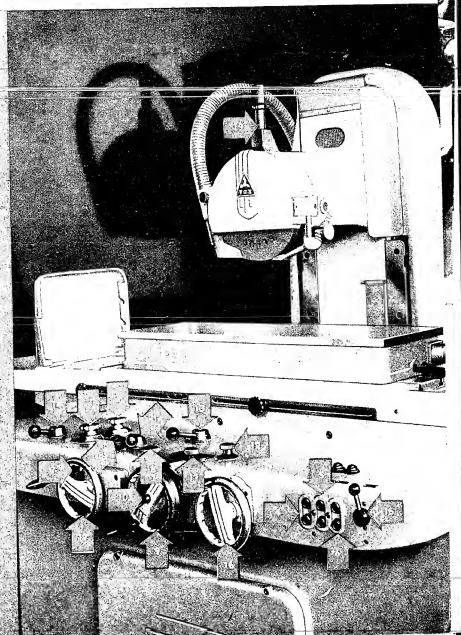
THE BED contains in its lower part an oil tank for the hydraulic system. An oil pump with a relief valve is mounted above it. **LUBRICATION:** The table and the cross slide ways have automatic lubrication. The wheel head guides and the controlling mechanism are lubricated from oil cups.

THE ELECTRICAL EQUIPMENT consists of motors and contactors with thermal relays and remote push button control. The electric panel is located within the bed and is easily accessible.

STANDARD EQUIPMENT: grinding wheel with balancing flange, motor for wheel spindle drive, motor for oil pump drive, motor for vertical adjustment of wheel head, push button with protective contactors, micrometer cross feed, demagnetizing switch for the electromagnetic chuck, wheel truing device attached to the wheel head, set of spanners, operating instructions.

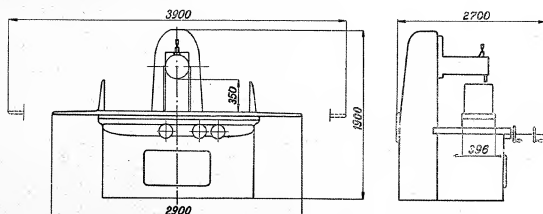
OPTIONAL EQUIPMENT: dust exhaust attachment, cooling attachment, electromagnetic chuck, rectifier for the electromagnetic chuck, wheel balancing stand with balancing arbour, wheel dresser to be mounted on the table (without diamond), spare flange for grinding wheel, longitudinal stop, radius truing device.

1. Starting and stopping of machine
2. Regulation of longitudinal feed
3. Regulation of cross feed
4. Starting and stopping of hydraulic pump
5. Starting and stopping of wheel spindle
6. Coarse adjustment of spindle for height
7. Regulation of cross feed in table reversal
8. Adjustment of cross feed in one or in both table reversals
9. Fine adjustment of wheel head for height
10. Engaging of automatic vertical feed
11. Adjustment of automatic wheel head feed into the cut
12. Adjustment of the number of automatic wheel feeds into the cut in table reversals
13. Lever for changing the direction of the longitudinal table feed in any position
14. Lever for changing of the direction of the cross feed in any position
15. Engaging and disengaging of the electromagnetic chuck
16. Longitudinal feed by hand
17. Cross feed by hand
18. Scale for hand adjustment of cross feed (reads in mm in the range of 120 mm)
19. Wheel truing device



SPECIFICATION

Working surface of table	mm	315	1000	12'4" - 39'3"
Dimensions of grinding wheel	mm	300	30	76 11'8" 12' - 3"
Minimum diameter of grinding wheel	mm	150		6"
Longitudinal travel of table	mm	1000		39'3"
Cross travel of cross slide	mm	315		12'4"
Vertical travel of wheel spindle	mm	350		13'8" (19'7")
Cross feed of table ranging from	mm	0' - 6		0.004 - 2'3"
Cross feed of table infinitely variable ranging from	mm	0 - 1		0 - 0.004"
Vertical feed into the cut ranging from	mm	0 - 2'07		0 - 0.0027"
Vertical power feed of wheel head	m/min	0.12		16.6' per min.
Motor for wheel spindle drive: speed	r.p.m.	2850		2850 rev/min.
output	HP	2.8		2.8 HP
Motor for vertical travel of wheel head: speed	r.p.m.	2800		2800 rev/min.
output	HP	0.68		0.68 HP
Motor for oil pump drive: speed	r.p.m.	1400		1400 rev/min.
output	HP	4		4 HP
Floor space required	mm	2700	3900	106' - 153'
Weight of machine: with standard equipment	kg	2450		5500 lbs
with packing	kg	2600		6200 lbs
with seaworthy packing	kg	3100		6800 lbs
Contents boxed	m ³	12		425 cu. ft.

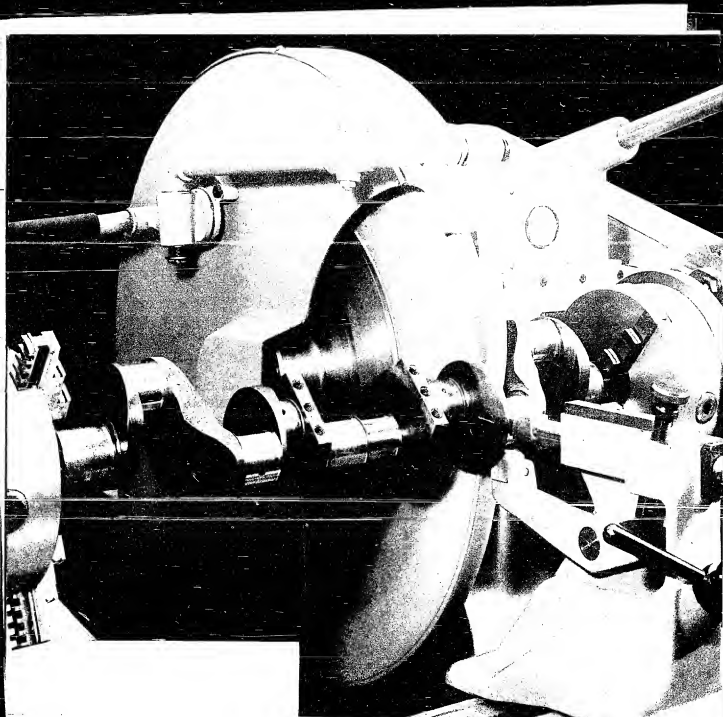
Present Exporters: **STROJEXPORT**

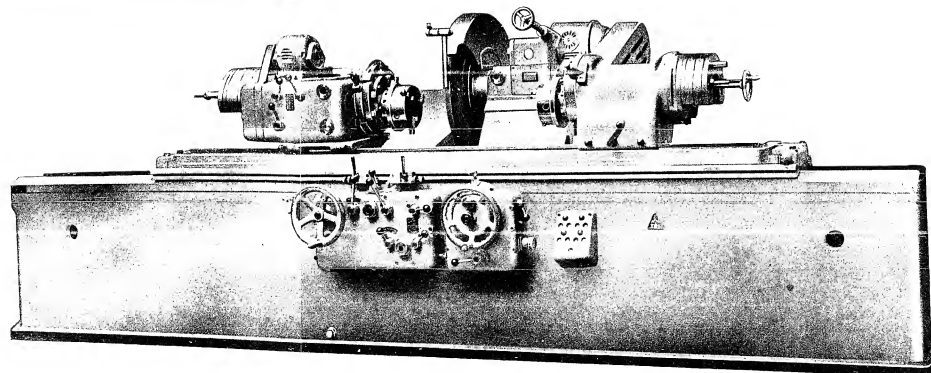
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

(IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY)

KOVO

PRAHA - CZECHOSLOVAKIA

**CRANKSHAFT GRINDER**



CRANKSHAFT GRINDER

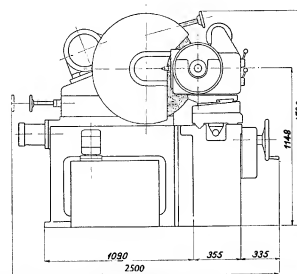
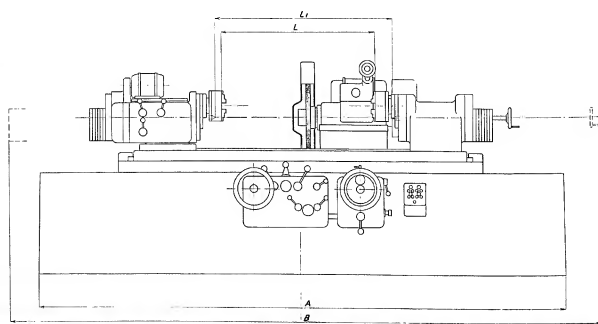
This heavy duty machine is built for production grinding of crankshaft main line bearings and crankpins, and also meets all the requirements of garages and repair shops for re-grinding the pins and journals of motor car crankshafts.

The hydraulically operated table traverse and the automatic cross feed of the wheel head permit the machine to be used for plain grinding operations.

THE WORK HEAD swivels 90° and is arranged for grinding between dead centres and for chucking work. The spindle, which runs in adjustable precision roller bearings, is fitted with a catch plate provided with guide-ways for adjusting the chuck to the required eccentricity. The catch plate has notches on its circumference for securing the crankshaft in position when balancing the crankpins. The plate under the chuck is provided

with notches for accurate and quick adjustment of the crankshaft and swivels 90° and 180° or, if necessary 120° when grinding crankpins. The rear end of the spindle carries adjustable counterweights. The work head is adjusted on the table by means of a rack and pinion.

THE WHEEL HEAD is mounted on a slide travelling in the cross guides of the bed. The grinding wheel is fed into the cut by hand (coarse or fine feed) or hydraulically at every table reversal, or at the right or left-hand reversal only. In the plunge cut method the wheel is fed into the cut independently of the table motion. The rapid adjustment of the wheel slide is effected hydraulically. The wheel head spindle is mounted in adjustable plain bearings and driven by V-belts from an individual motor. The spindle is finely adjustable in axial direction. The axial feed can be read on a built-in dial indicator.



THE TABLE consists of two parts, its top part being adjustable on a scale for taper grinding. The table traverse is effected by hand (coarse or fine) or hydraulically and is limited by coarsely and finely adjustable stops. Stopping at every reversal can be adjusted up to 5 seconds.

L	L ₁	A	B
1600	1800	4720	6100

TAILSTOCK. The tailstock spindle and the clamping and balancing attachments are of the same design as those on the work head. The centre sleeve is adjusted by a hand wheel. The centre is held against the work by spring tension. The tailstock is adjusted on the table by a rack and pinion.

THE BED of sturdy construction is heavily ribbed to prevent any vibration. The table guideways are automatically lubricated.

COOLING. The coolant is supplied by an electric pump from a tank located outside the machine.

THE ELECTRICAL EQUIPMENT consists of electric motors for the work head and wheel head and motors for the pumps of the hydraulic and cooling systems. The motors have protective contactors with remote push button control.

STANDARD EQUIPMENT: Workhead for grinding between dead centres or in a chuck, two-speed hand traverse of table and wheel slide, axial feed of grinding wheel - 8 mm for precision grinding of fillets by hand (with indicator), hydraulic table traverse, hydraulic feed of wheel-head and hydraulic rapid traverse of wheel slide, 4 electric motors for 3x380 volts, 50 cycles, including electrical equipment, 2 three-jaw chucks dia. approx. 200 mm, grinding wheel dia. 760 x 32 mm with balancing flange, balancing arbor, wheel puller, change pulley for worn grinding wheel, wheel guard, 2 steady rests, locating attachment for adjusting the crank pins, coolant pump with piping and tank, splash guards, 14 counterweights, wheel truing device to be mounted on the steady rest (less diamond), wheel dresser to be mounted on the steady rest (less diamond), measuring plate on the table, positive stop of longitudinal table feed, bed levelling plate, set of wedges for levelling the bed, set of belts, set of spanners, operator's instruction booklet.

OPTIONAL EQUIPMENT: Steady work-holders instead of adjustable chucks for clamping crank shafts (supplied on hand of drawings of crank shafts and suitable for mass production only), locating attachment for adjusting the crank pins in plunge-cut grinding (without template), wheel truing device to be mounted on the table (less diamond), wheel dresser to be mounted on the table (less diamond), additional steady rest, narrow steady rest (18 mm), additional balancing flange 18-32, 40, 50 mm wide, ruler for measuring crank pins, electric motors for current characteristics other than 3x380 volts, 50 cycles, grinding wheel balancing stand, spot light.

SPECIFICATIONS:

	Metric	English
Swing	mm 500	19 1/2"
Distance between chucks	mm 1600	63"
Distance between centres	mm 1800	71"
Max. eccentricity of pin	mm 120	4 7/8"
Max. dia. ground in work rest	mm 130	5 1/8"
Standard grinding wheel: max. dia.	mm 760	29 9/16"
min-max. width	mm 18/32	0 7/16"
I. p. of grinding wheel	mm 800, 1000	800, 1000
Taper of work spindle	Morse 5	5
Taper of tailstock centre sleeve	Morse 5	5
Work head swivels	90°	90°
Table swivels	5°	5°
Maximum taper ground	1 : 6	1 : 6
Maximum longitudinal table motion	mm 2150	84 5/8"
Minimum longitudinal table motion	mm 1	0.04"
Speed of table infinitely variable	m/min. 0.1-6	4-20 feet per min.
Wheel head: cross motion	mm 160	6 3/8"
rapid hydraulic motion	mm 90	3 5/8"
adjustment on wheel slide	mm 250	9 7/8"
automatic feed at table reversals (referring to the diameter ground)	mm 0.005-0.05	0.0002"-0.002"
automatic feed in plunge-cut grinding (referring to the diameter ground)	mm/min. 0.05-4	0.002-0.15 in per min.
Axial motion of grinding wheel in either direction	mm 8	0.31"
Range of work spindle speeds	r. p. m. 20-200	20-200
Number of work spindle speeds	6	6
Motors: work head motor	r. p. m. 1400	1400
output	kW 0.6	0.6
wheel head motor	r. p. m. 940	940
output	kW 0.5	0.5
hydraulic pump motor	r. p. m. 1400	1400
output	kW 1.85	1.85
coolant pump motor	r. p. m. 2800	2800
output	kW 0.25	0.25
Floor space required	mm 2500x6100	98"x240"
Weight of machine: with standard equipment	kg 7200	15,880 lbs
packed for rail	kg 7720	17,100 lbs
packed for ocean shipment	kg 8500	18,600 lbs
Dimensions of case	m 5.2 x 2.1 x 2	205" x 83" x 80"

When ordering, specify voltage, phase and frequency of power supply.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT - PRAHA - CZECHOSLOVAKIA

STROJEXPORT

STAT

TYPE 7U UNIVERSAL GRINDING MACHINE

A heavy duty precision machine for cylindrical grinding, both longitudinal and plunge cut, and for face grinding and internal grinding.

Hydraulic table feed.

Hydraulic feed of wheelhead.

Hydraulic rapid traverse of wheelhead.

Swivelling wheelhead for grinding of tapers by infed method.

Workhead with 8 spindle speeds and with 90° swivel for face grinding.

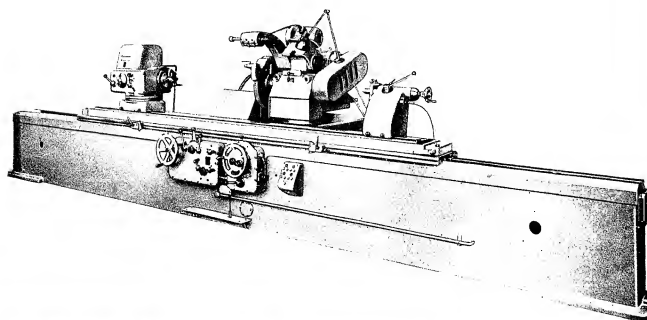
Two-speed hand feed of table.

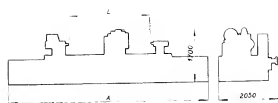
Standard Equipment

Universal workhead for grinding between dead centers and in chuck, three-jaw chuck 320 mm (12 19/32") dia., hydraulic tailstock with diamond bracket and with hand wheel for fine movement of tailstock sleeve, 2 centers, open rests (2 units for 2500 mm, i. e. 8' 3" between centers, 3 units for 3000 mm, i. e. 9' 10" between centers), set of drivers, swivelling wheel-head with wheelguard for 500 X 75 mm (20" X 3") grinding wheel, grinding wheel 500 X 75 X 203 mm (20" X 3" X 8") with balancing flange, grinding wheel flange puller, balancing arbor, extra belt pulley for worn grinding wheel, complete cooling equipment, splash guards, 4 electric motors for 380 Volts, 3 phase, 50 cycles, set of belts, set of spanners, measuring plate for levelling of bed, means for levelling of machine, operating instructions.

Optional Equipment

Folding internal grinding attachment for 100 mm (3 15/16") dia. spindle, with reducing sleeve for 70 mm (2 3/4") dia., spindle, folding diamond bracket without diamond, closed rest for 170 mm (6 11/16") dia., spindles for internal grinding, balancing flange of grinding wheel, open rest, radius truing attachment (without diamond), attachment for truing grinding wheel according to template (without template or diamond), attachment for grinding sleep stapers, balancing stand, electromagnetic chuck 300 mm (11 13/16") dia. with demagnetising switch, rectifier for electromagnetic chuck, lighting, electric motors and equipment for voltages others than 380 Volts, 50 cycles.





SPECIFICATION

Dimensional Drawing

Swing over bed	mm	660	26"	9' 10"
Distance between centers	mm	2500 3000	8' 3"	9' 10"
Swing in open rest	mm	180	7' 3' 52"	
GRINDING WHEEL: diameter X width	mm	500 X 75	20" X 3"	
Bore of grinding wheel, dia.	mm	260	8"	

WORKHEAD — TAILSTOCK:

Taper of workhead and tailstock centers	mm	320	No. 5 Morse	12 19/32"
Diameter of chuck, approx.	mm	300		11 13/16"
Diameter of electromagnetic chuck	mm		90°	
Swivel of workhead			8	
Number of workspindle speeds			12 to 290	
Range of workspindle speeds	r. p. m.		1400	
Electric motor: speed	r. p. m.		1.1	
output	kW			

WHEELHEAD:

Swivel of wheelhead (without workpiece)		90°		
Transverse movement of wheelhead	mm	250	9 27/32"	
Movement of wheelhead by hydraulic rapid traverse	mm	55	2 5/32"	
Movement of wheelhead on slide	mm	285	11 7/32"	
Power input: during reversal of table, reduction of dia.	mm	0.005 to 0.05	0.0002" to 0.002"	
during plunge cut grinding, per minute	mm	0.05 to 4	0.002" to 0.10"	
Grinding wheel speed	r. p. m.		1165 to 1590	
Electric motor: speed	r. p. m.		1440	
output	kW		7.5	

TABLE:

Swivel of table		4' 20" 3' 40"	4' 20" 3' 40"	
Maximum longitudinal travel of table	mm	2650 3150	104" 124"	
Minimum longitudinal travel of table	mm	1	0.04"	
Speed of table (hydraulic) per minute, infinitely variable metres		0.1 to 5	4" to 16' 5"	
Electric motor of pump of hydraulic control: speed	r. p. m.		1400	
output	kW		2.2	
Electric motor of coolant pump: speed	r. p. m.		2775	
output	kW		0.175	

INTERNAL GRINDING:

Electric motor: speed	r. p. m.	2800	
output	kW	1.6	

DIMENSIONS AND WEIGHTS:

Floor space required by machine: width	mm	2500	8' 3"	
length	mm	6600 7500	21' 8" 24' 8"	
Weight of machine with standard equipment, net, approx.	kg	6100 9900	13450 21830 lbs	
Shipping weight of machine, seaworthy packing, approx.	kg	10800 11900	23810 26230 lbs	
Dimensions of packing case: length, approx.	mm	7100 8000	23' 4" 26' 3"	
width X height, approx.	mm	2500 X 2000	8' 3" X 6' 7"	

Please state in your order the voltage available for the electric motors.
Changes reserved.

STROJEXPORT

PRAHA - CZECHOSLOVAKIA

SPECIFICATIONS:

3

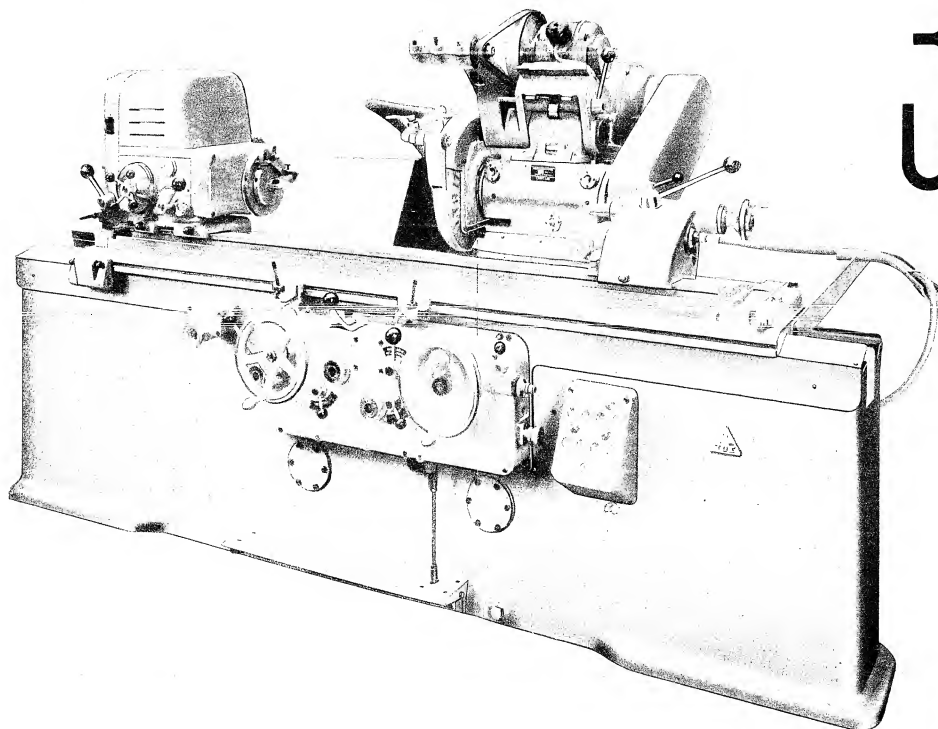
L	mm	800	31 1/2"
A	mm	1240	49 1/8"
B	mm	1240	49 1/8"
Maximum swing over table	mm	500	19 1/2"
Maximum distance between centers	mm	425	16 3/4"
Maximum swing of workhead	mm	425	16 3/4"
Maximum distance, wheel chuck to internal spindle holder	mm	425	16 3/4"
GRINDING WHEEL: Diameter X Width	mm	400 X 127	15 7/8" X 5"
Maximum width of grinding wheel	mm	30	1 1/8"
WORKHEAD/TAILSTOCK:			
Taper in Work Head Spindle	Morse	4	
Taper in tailstock center sleeve	Morse	4	
Range of work speeds	r. p. m.	10—1240	75—112—140—157—180
Work Head Motor: Speed	r. p. m.	1440	
output	kW	1	
WHEELHEAD:			
Swivel in both directions		90°	
Maximum travel of wheel head cross slide	mm	250	9 27/32"
Rapid traverse of wheel head cross slide	mm	55	2 5/32"
Head may be moved back on slide	mm	285	11 7/32"
AUTOMATIC FEED:			
Swivel in both directions		90°	
Feed in plunge cut grinding (independent of table motion)	mm	0.005—0.05	0.0002"—0.002"
Feed in full size work cut wheel	mm	0.05 to 4	0.002" to 0.10"
Speed of table (hydraulic) per minute, infinitely variable metres		0.1 to 5	4" to 16' 5"
Electric motor of pump of hydraulic control: speed	r. p. m.	1400	
output	kW	2.2	
Electric motor of coolant pump: speed	r. p. m.	2775	
output	kW	0.175	
INTERNAL GRINDING ATTACHMENT:			
Bore of internal spindle sleeve	mm	75	2 5/8"
Electric motor: speed	r. p. m.	2800	
output	kW	1.6	
SHIPPING DATA:			
Floor space required: width	mm	2500	8' 3"
length	mm	6600 7500	21' 8" 24' 8"
Weight of machine: with standard equipment	kg	6100 9900	13450 21830 lbs
with seaworthy packing	kg	10800 11900	23810 26230 lbs
Shipping weight of machine, seaworthy packing	kg	10800 11900	23810 26230 lbs
Dimensions of packing case: length, approx.	mm	7100 8000	23' 4" 26' 3"
width X height, approx.	mm	2500 X 2000	8' 3" X 6' 7"

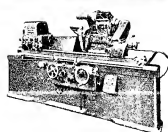
IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

KOVO PRAHA - CZECHOSLOVAKIA

UNIVERSAL GRINDING MACHINE MODEL

3





UNIVERSAL GRINDING MACHINE Model 3U

Heavy Duty Precision Machine for cylindrical (traverse and infeed) grinding with fixed or oscillating table, as well as for internal, taper and face grinding.

Hydraulic Table Traverse

Hydraulic Infeed

Hydraulic Rapid Traverse of Wheel Head Cross Slide

Swivelling Wheelhead

Work Head with 8 Spindle Speeds Swivels 90° for Taper and Face Grinding

STANDARD EQUIPMENT:

Universal swivelling workhead for grinding between dead centers or in scroll chuck, three-jaw chuck O. D. 190 mm with 2 sets of jaws, tailstock (for 500 with lever-operated, for 800 and 1200 with hydraulically operated center sleeve) with handwheel for fine feed of center sleeve and with micrometric diamond bracket (without diamond), 2 centers, grinding wheel O. D. 400X50 mm with balancing flange, wheel pulley, balancing arbor for grinding wheel, wheelguard, extra sheave for worn wheels, open rest (for 500 and 800 — 1 piece, for 1200 — 2 pieces), swing down internal grinding attachment for spindles dia. 70 mm with one spindle A 20 and equipment, closed rest (max. swing 90 mm), swing down micrometric diamond bracket (table type) without diamond, micrometric stop for hand table traverse, 1 set of carriers, coolant pump with tank and piping, 1 set of splash guards, electrical equipment with 5 motors to suite three-phase current 380 volts, 50 cycles with protective contactors and remote push button control, set of bells, set of wrenches, operator's instruction booklet.

OPTIONAL EQUIPMENT:

Radius truing attachment (without diamond), profile truing attachment (without template and diamond), attachment for grinding steep tapers between dead centers (tapers up to 120°, 100 mm, length 150 mm), balancing flange for grinding wheel, balancing stand for grinding wheel, additional steady rest, collet chuck attachment (ranging from 5—16 mm, stepped by 1 mm) including 1 collet, collets, additional internal grinding spindles, electromagnetic chuck O. D. 200 mm with demagnetising switch, rectifier for the electromagnetic chuck, wheelguard and balancing flange for grinding wheels bigger than 400X50 mm, electric motors and electrical equipment for voltage other than 380 volts, 50 cycles (on request), spot light.



STROJEXPORT

TYPE 5U UNIVERSAL GRINDER

A heavy duty precision machine for cylindrical grinding, both longitudinal and plunge cut, and for face grinding and internal grinding.

Hydraulic table feed.

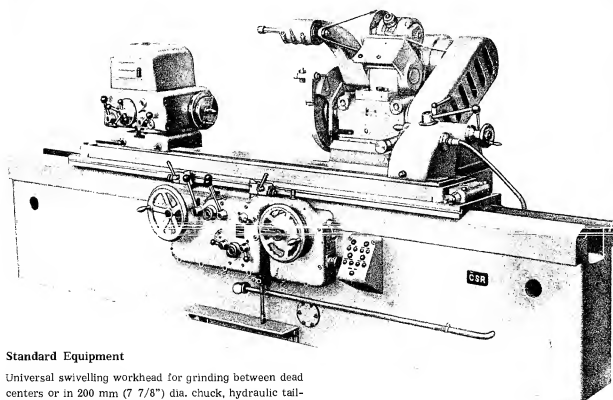
Hydraulic feed of wheelhead.

Hydraulic rapid travel of wheelhead.

Swivelling wheelhead for grinding of tapers by infeed method.

Workhead with 8 spindle speeds and with 90° swivel for face grinding.

Two-speed hand feed of table.



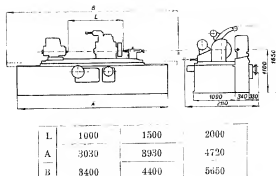
Standard Equipment

Universal swivelling workhead for grinding between dead centers or in 200 mm (7 7/8") dia. chuck, hydraulic tailstock with diamond bracket (without diamond), 2 centers, open rests (for 1000 mm, i. e. 39 11/32" between centers 1 unit, for 1500 mm, i. e. 59 7/8" between centers 2 units, for 2000 mm, i. e. 78 3/4" 3 units), set of drivers, wheelhead with wheelguard for 450X50 mm (18"X2") grinding wheel, grinding wheel 450X50 mm (18"X2") with balancing flange, grinding wheel flange pulley, balancing arbor, extra belt pulley for worn grinding wheel, coolant pump with tank and piping, splash guards, electrical equipment with 4 electric motors for 380 Volts, 3 phase, 50 cycles with protective contactors and remote push-button control, set of spanners, operating instructions.

Optional Equipment

Folding internal grinding attachment, without spindle,

with electric motor for 100 mm (3 15/16") dia. spindle and reducing sleeve for 70 mm (2 3/4") dia. spindle, folding diamond bracket (without diamond), closed rest (maximum dia. 105 mm, i. e. 4 1/8"), further spindles for internal grinding, balancing flange of grinding wheel, open rest, radius truing attachment (without diamond), attachment for truing grinding wheel according to template (without template or diamond), attachment for grinding steep tapers, balancing stand, collet chuck including 1 collet (range 5 to 16 mm, i. e. 13/64" to 5/8"), further collets, electromagnetic chuck 200 mm (7 7/8") dia. with demagnetizing switch, rectifier for electromagnetic chuck, lighting, electric motors and equipment for voltages other than 380 Volts, 50 cycles.



Dimensional Drawing

SPECIFICATION

Swing over bed	mm	400	15 3/4"
Distance between centers	mm	1000 1300 2000	39 1/2" 51 1/8" 78 3/4"
Swing in open rest	mm	120	4 3/8"
GRINDING WHEEL: diameter X width	mm	150 X 50	6" X 2"
Maximum width of grinding wheel	mm	100	4"
Bore of grinding wheel, dia.	mm	203	8"

WORKHEAD — TAILSTOCK:

Taper of workhead and tailstock centers	No. 4 Morse
Swivel of workhead	90
Number of workspindle speeds	8
Range of workspindle speeds	15 to 375
Electric motor: speed r. p. m. — output kW	1400 0.8

WHEELHEAD:

Swivel of wheelhead (without workpiece)	60
Transverse movement of wheelhead	mm 190 7 1/2"
Swivel of wheelhead on slide	mm 220 11"
Power infeed during reversal of table (R. H. side, L. H. side, both sides), reduction of diameter	mm 0.005 to 0.04 0.0002" to 0.0016"
Power infeed during plunge cut grinding (independent of table), reduction of diameter, per minute	mm 0.1 to 0.4 0.004" to 0.016"
Grinding wheel speed	r. p. m. 1425 1285/1585 5.5
Electric motor: speed r. p. m. — output kW	1400 1.35

TABLE:

Swivel of table	6° 5° 5°
Maximum taper ground	1:5 1:6 1:6
Maximum longitudinal travel of table	mm 1185 1625 2150 46 21/32" 64" 84 21/32"
Minimum travel of table (hydraulic)	mm 1 0.04"
Speed of table per minute, infinitely variable	metres 0.1 to 6 4" to 19'8"
Electric motor of pump of hydraulic control: speed r. p. m. — output kW	1400 1.35

Electric motor of coolant pump: speed r. p. m. — output kW	2775 0.175
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INTERNAL GRINDING (optional equipment):

Electric motor: speed r. p. m. — output kW	2800 1.6
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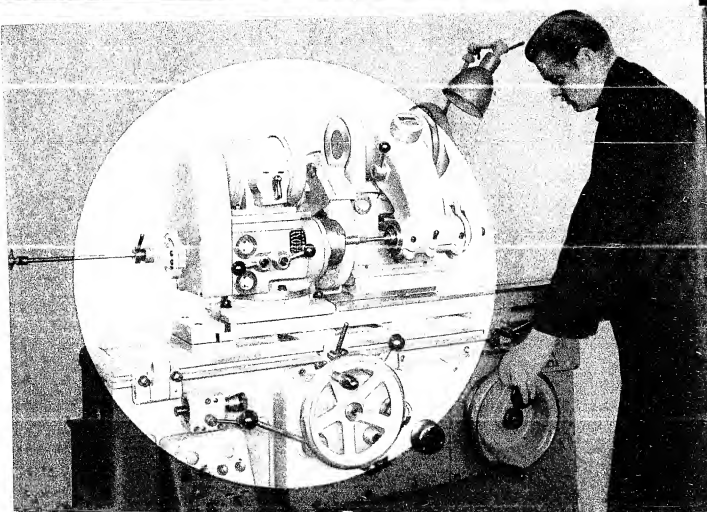
DIMENSIONS AND WEIGHTS:

Floor space required by machine: width	mm 2100 6'1"
length	mm 5400 5400 5650 11'2" 14'5" 18'6"
Weight of machine with standard equipment, net, approx.	kg 5500 5800 6400 12150 12790 14110 lbs
Shipping weight of machine, seaworthy packing, approx.	kg 6400 7000 7700 14110 15430 16960 lbs
Dimensions of packing case: length, approx.	mm 3200 4200 5200 10'6" 13'9" 17'1"
width X height, approx.	mm 2350 X 2000 7'9" X 6'7"

Please state in your order the voltage available for the electric motors.
Changes reserved.

STROJEXPORT
PRAHA — CZECHOSLOVAKIA





KAMENICEK TYPES 1U, 2Uc UNIVERSAL GRINDING MACHINES

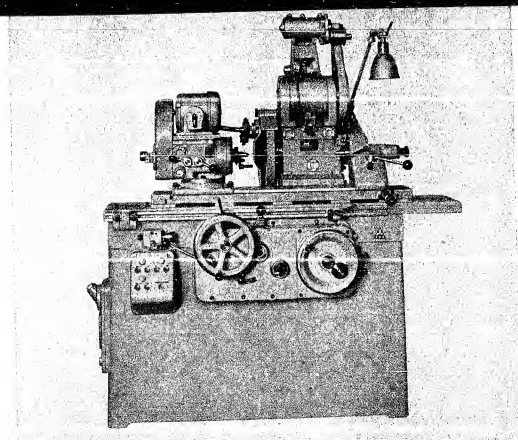
Model



are heavy-duty precision machines equipped with a hydraulic table traverse and a hydraulic index. The machines are suitable for cylindrical, surface and internal grinding, both longitudinal and radial. The setting of the grinding machines for the various operations is very easy and quick, so that the machines can be utilized economically for both single pieces and multiple production.

The type 1U grinding machines have the hydraulic index operated only in the right hand table reversal and are not equipped with power cross feed of the wheelhead for radial grinding.

The type 2Uc grinders, the hydraulic index of which is operated in both table reversal or in one of them depending on the setting, are supplied designed with power cross feed for radial grinding, and the models with lengths between centers of 550 mm and 1000 mm (20 1/2" and 39 3/8") are fitted with a hydraulic rail track.

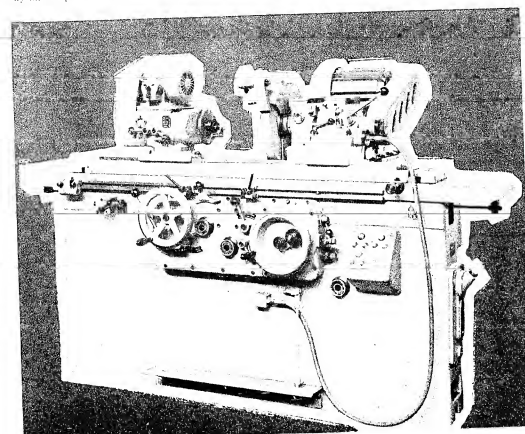


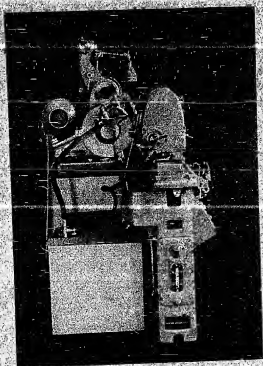
DESCRIPTION

The *Wheelhead* is arranged for grinding between dead centers or in a chuck. The workhead can be swivelled 90° for surface grinding and the workpiece can be fixed to a magnetic chuck. The spindle, which is made of nitro-steel, is mounted in adjustable plain bearings. The machine is lubricated by an automatic pressure lubrication system.

The *Wheelhead* swivels and on type 2Uc grinding machines it is equipped with hydraulic rapid traverse in either direction. The spindle is mounted in adjustable plain bearings and driven by an independent electric motor.

The machine is also supplied with a folding internal grinding attachment on the wheelhead which is driven by an independent electric motor by means of an endless woven belt.





The Table consists of two parts. The lower part is mounted in a prismatic and in a flat guideway of the bed, the upper part may be swivelled in accordance with the grinding process. The hydraulic table feed can be limited by stops which have a coarse and a fine adjustment. The dwell in the reversals can be varied between 0 and 3 seconds. The oscillation of the table for tapered grinding is adjustable.

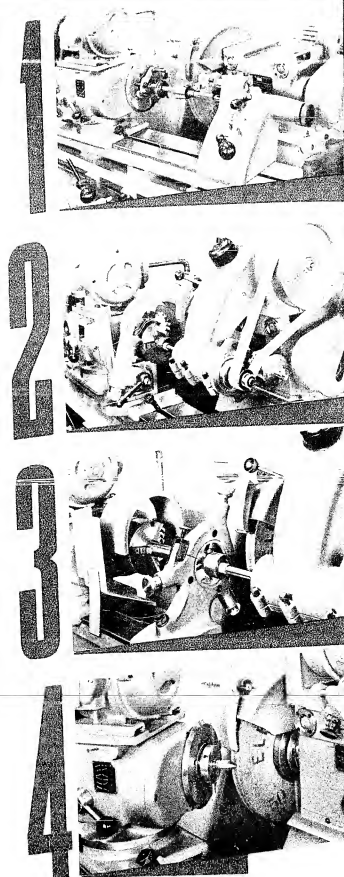
The Table rest. The table rest is covered by a hand lever. The pressure of the table against the workpiece can be adjusted as required by means of a spring. A micrometer diamond block is also fitted to the table rest.

The Bed. The guideway is checked and lubricated automatically. The lower part of the bed forms the oil tank of the hydraulic pump.

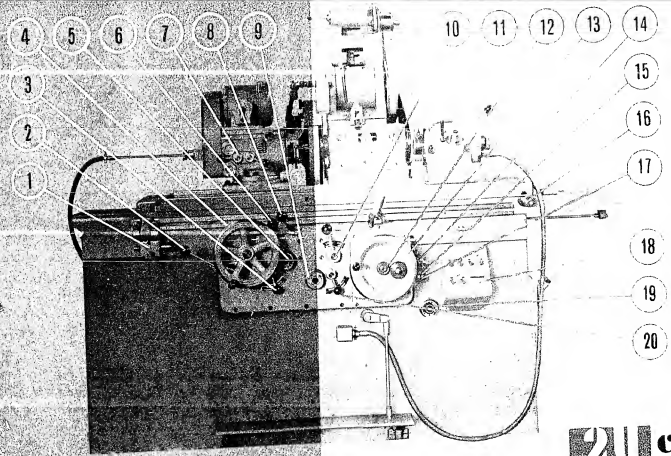
Cooling. The coolant pump is fitted near to the machine in a tank with a filling stage.

The Electrical Equipment consists of the statically and dynamically balanced electric motors for the workhead and of the electric motor of the pump for the hydraulic system and for the coolant. The motors are equipped with protective contactors which are remote controlled by push-button.

KAMENICEK



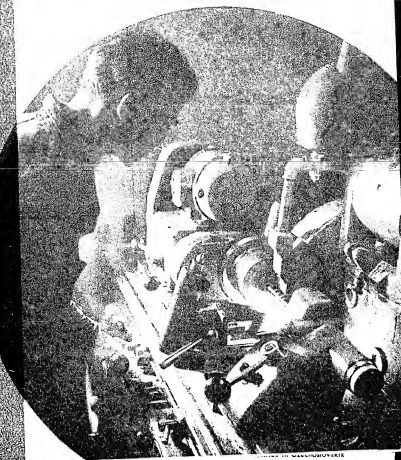
1. Cylindrical Grinding
2. Internal Grinding
3. Internal Grinding with Rest
4. Grinding of Steep Taper



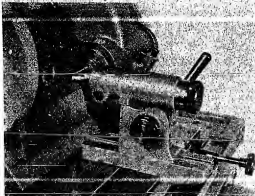
1. Stop Box for Internal Grinding
2. Starting Lever of Hydraulic Table Traverse
3. Speed Control of Table
4. Hand Wheel of Table Traverse
5. Push-Button for Stopping of Table during Reversal
6. Adjustable Stop for Limiting Elevation of Table
7. Speed Change Lever of Wheelhead
8. Table Traverse Reversing Lever
9. Push-Button for Setting of Type of Feed of Wheelhead toward Workpiece
10. Lever of Rapid Traverse of Wheelhead - Forward or Reverse
11. Diamond Holder or Sleeve
12. Feed Brake
13. Hand Wheel for Movement of Grinding Wheel toward Workpiece
14. Starting Lever of Power Feed
15. Sliding Push-Button for Grinding against Position Stop with Fine Adjustment
16. Screw for Relaxation of Table
17. Screw for Setting of Rate of Feed
18. Push-Button Stop
19. Push-Button for Softening of Table Reversal
20. Lever for Setting of Rate of Table

KAMENICEK

LAYOUT OF CONTROLS

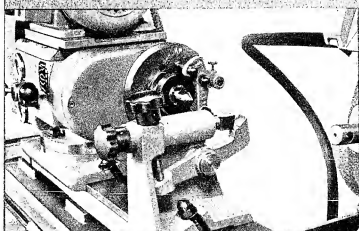
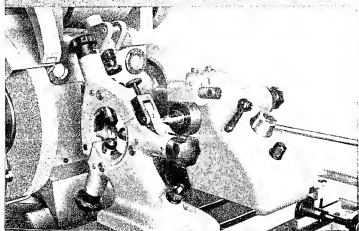


STANDARD EQUIPMENT AND ACCESSORIES



Truing Device

The truing device folds away so that it need not be removed for internal grinding and attached to the table again for further truing of the wheel.



Open Rest



Spindles for Internal Grinding

- Universal workhead
- Three-jaw chuck, approx. 113 mm (4 1/2") dia.
- Tailstock with lever control of tailstock sleeve
- Tailstock with hydraulic control of tailstock sleeve (only for type 2 U machines with 750 or 1000 mm (29 1/2" or 39 3/8") between centers)
- Truing device (without diamond)
- 2 centers
- Grinding wheel, 300 x 32 x 76 mm (11 3/4" x 1 1/4" x 3") with balancing flange, dia. ext. 4 1/4"
- Grinding wheel, 370 x 40 x 127 mm (14 1/2" x 1 5/8" x 5") with balancing flange (for type 2 U)
- Wheel puller
- Balancing arbor
- Wheelguard
- Extra belt pulley for worm grinding wheel (for type 2 U only)
- Open rest (for 1000 mm i. c. 39 3/8" between centers—2 units)
- Folding universal grinding attachment for 70 mm (2 3/4") dia. spindles with X 20 spindle
- Close rest for spindles up to 70 mm (2 3/4") dia.
- Folding micrometer truing device (table type) without diamond
- Stop box for table traverse
- Set of drivers
- Coolant pump with piping and tank
- Set of splash guards
- 4 electric motors for 380 Volts, 50 cycles
- Electrical equipment for 380 Volts, 50 cycles
- Set of belts
- Set of spanners
- Operating instruction booklet

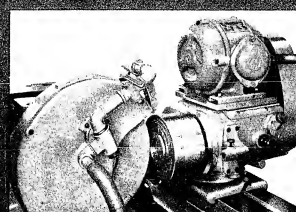
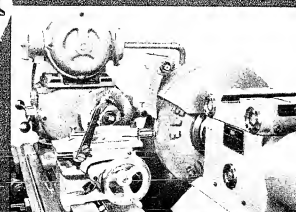
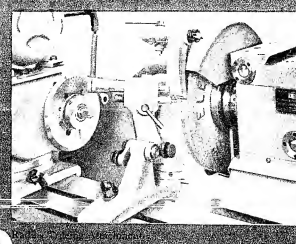
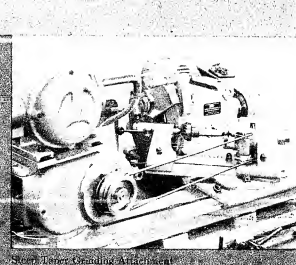
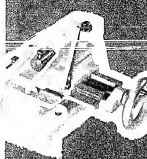
KAMENICEK

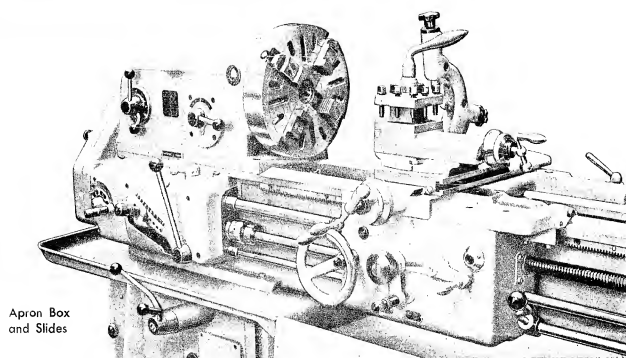
OPTIONAL EQUIPMENT

- Radius truing attachment (without diamond)
- Profile truing attachment (without template or diamond)
- Attachment for grinding steep tapers between dead centers: tapers up to 120, 150 mm (5 1/2", 6" dia., 110 mm (4 3/8") long
- Additional balancing flange for grinding wheel
- Balancing stand for grinding wheel
- Additional rest
- Collet chuck attachment with range from 3 to 12 mm arranged in 0.5 mm increments, including 1 collet
- Additional collets
- Equipment for opening of collet chuck during operation of workhead
- Additional spindles for internal grinding according to special specification
- Electromagnetic chuck, 150 mm (6") dia. with demagnetizing switch
- Rectifier for electromagnetic chuck
- Electric motors and electrical equipment for other voltages than 380 Volts, 50 cycles
- Lighting

The attachment for grinding steep tapers consists of a cross slide and a workhead which the workhead and the tailstock of the machine are mounted on. The workhead is driven off the main spindle of the machine. The workpiece is held between the centers of the workhead and the tailstock. The apex angle up to 120° can be obtained by swiveling the workhead.

The profile truing attachment is also attached to the cross slide. It consists of a cross slide the top part of which moves crosswise with the diamond holder. This top slide is pivoted to the cross slide by a spring. The bottom slide affords a longitudinal movement of the diamond holder by a hand wheel by means of a screw.





Apron Box and Slides

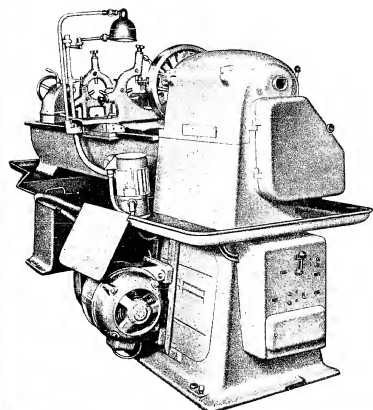
The Apron Box and the longitudinal slide are combined into a solid unit. Here the principle of simple operation was satisfied by a clear layout of controls. The carriage is moved by hand by means of a hand wheel on the apron box and the longitudinal or cross power feed are engaged by tightening the clutch knob and shifting the appropriate lever. The lever at the right-hand side of the apron box serves for engaging the split clasp nut. The movement of the lever is interlocked with the change of the power feeds. A lever controlling the multi-plate clutch of the gearbox serving for starting and reversing the machine is conveniently fitted at the operator's right. The thread indicator is fitted directly in the apron box. All gears are centrally lubricated, the worm and worm gear run in an oil bath.

The Tailstock is of sturdy construction. The tailstock sleeve is hardened and accurately fitted. The tailstock can be moved quickly along the bed. It may also be moved on its base for the turning of steep tapers.

The Electrical Equipment is housed in a cabinet of its own fitted at the left of the outer side of the front leg and is easily accessible.

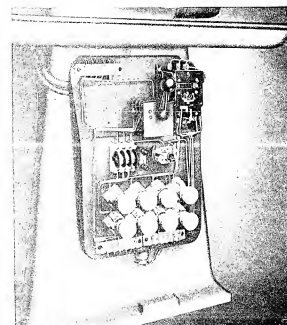
The Coolant is supplied by an electrically driven centrifugal pump arranged at the rear of the chip pan through a pipeline with joints directly to the tool. The coolant tank is at the bottom of the chip pan.

Drive of machine and coolant pump

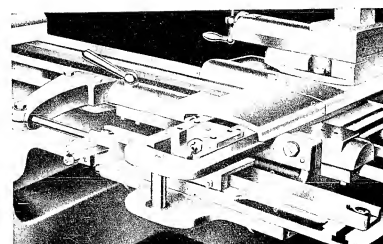


Standard equipment: (supplied normally with each machine and included in its price).
Electrical equipment without motors or lighting
Main motor, 3 kW, 1400 r. p. m.
Electric motor driven coolant pump SVET 0.125 kW, 2750 r. p. m.
Coolant pipeline and fittings
340 mm diameter jaw type face plate, 190 mm diameter driver plate with pin 2 centers (spindle and tailstock) with N° 3 Morse taper
N° 3.5 Morse taper reducing sleeve
Steady rest
Follow rest
Revolving 4-way tool block
12 change gears with 40, 45, 45, 50, 55, 65, 65, 70, 75, 80, 90, 127 teeth
Back plate for 190 mm dia. self-centering chuck
11 spacers
2 bars for adjustment of spindle bearings, screw-driver, oil can
Tool board
Operating instruction booklet

Special equipment: (supplied only to special order against extra charge)
Self-centering 3-jaw chuck
Self-centering 4-jaw chuck
Live-center with N° 3 Morse taper
Taper turning attachment or copying attachment
Change gears for module threads with 35, 42, 60, 97 m 126 teeth
Adjustable stops for longitudinal feed
Adjustable stops for cross feed



Electrical Equipment



Taper turning attachment

5 4 3 7 8 6 9 10 12 11 23 14 13 16

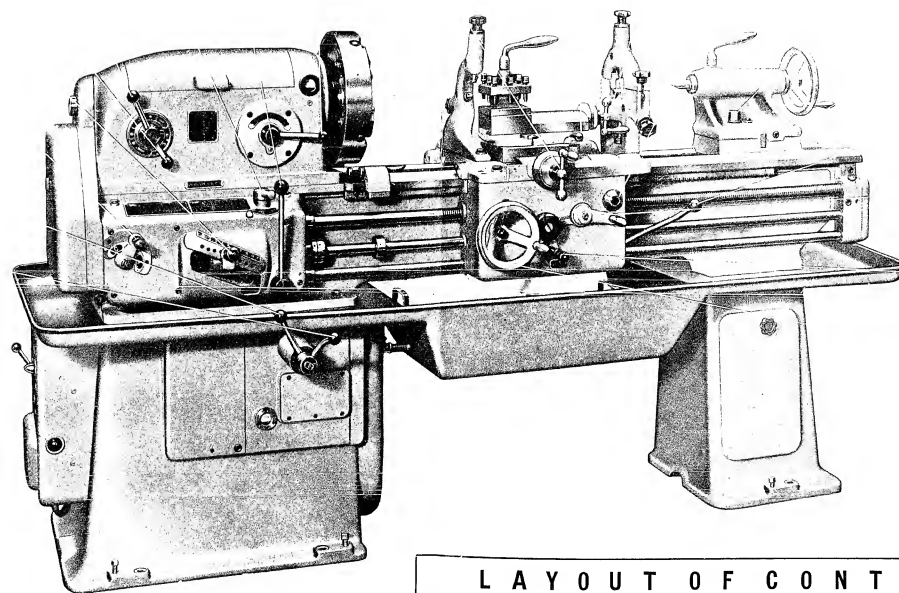
2 15

1 24

18 22

19 21

17 20



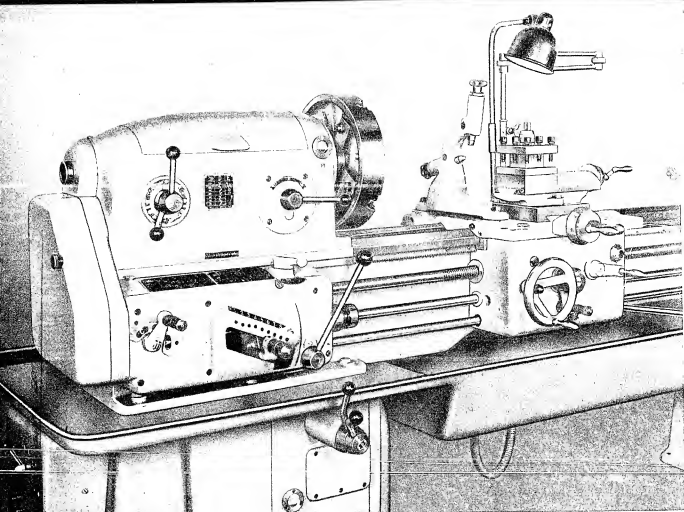
L A Y O U T O F C O N T R O L S

1. Knob for opening the change gear compartment.
2. Lever for engaging the back gears of feed and thread box.
3. Lever for starting, stopping and reversing the carriage feed.
4. Lever for standard and coarse threads.
5. Feed change lever.

6. Speed change lever (engagement of headstock back gears).
7. Lever for engagement of drive of lead screw or drawing spindle.
8. Starting lever — reversing of machine.
9. Crank for cross slide travel.
10. Handle for loosening and locking the four-way tool head and tool.

11. Crank for travel of tool slide.
12. Carriage locking lever.
13. Nut for securing the tailstock.
14. Tailstock sleeve locking lever.
15. Screw for accurate setting of tailstock.
16. Handwheel for movement of tailstock sleeve.
17. Signal light.

18. Speed change lever.
19. Speed change lever.
20. Handwheel for longitudinal carriage feed.
21. Power feed engaging lever (for longitudinal and cross feed).
22. Clasp nut control lever.
23. Thread indicator.
24. Starting lever — reversing of machine.



and feeds for screwcutting is clearly shown by operating plates. The reversing and stopping lever and the lever for screwcutting and turning are fitted conveniently on the headstock. The lead screw is manufactured with the greatest care and has an accurate pitch measured by special measuring instruments. It serves for screwcutting only. Gears for 27 Whitworth threads may be set by means of the gear levers alone and 9 more by means of change gears. Gears for 27 metric threads may be set by means of change gears alone. The same number of coarse threads in the ratio of 8:1 is made available by operating the appropriate lever on the headstock. 5 additional change gears are supplied against extra charge to give 34 module threads with modules ranging from 0.25 to 5. The drawing spindle has a stop for disengaging the longitudinal power feed and an adjustable safety clutch for protection against overload.

The Gear Box is conveniently designed and fitted in the box shaped front leg. It has four speeds which are changed by two concentrically fitted levers. A multi-plate clutch of generous proportions permits quick and smooth stopping and reversing. A low specific pressure and high grade of material increase its reliability and prolong its life. The clutch is easily accessible and adjustable. The sliding gears of the gear box are hardened and lubricated by an oil spray. They slide on ground multi-splined shafts.

The Carriage. The longitudinal slide has long guiding surfaces scraped to fit accurately to the bed ways and protected by wipers. It is made of special cast iron, sturdily built and forms the guide-ways for the cross slide. The rotating part may be set at any angle and forms a broad base for the tool slide with the revolving 4-way tool block which is locked in eight accurate positions. The driving screw of the cross slide is made to fit into the nut without backlash. The dividing rings have a large diameter so that the dials are easy to read and permit the tool to be accurately set. The longitudinal slide is locked on the bed for the turning of faces.

Adjustable stops for the longitudinal and cross feeds may be supplied on special request.

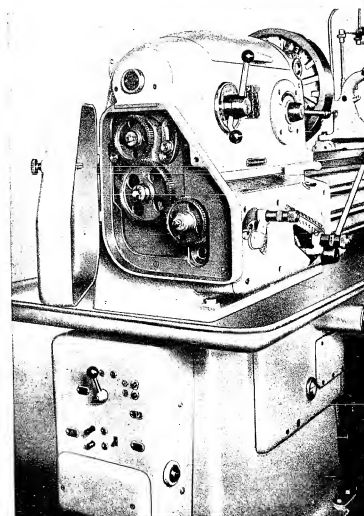
DESCRIPTION

The Headstock is of sturdy construction with smooth and pleasing lines. The spindle runs in substantial bearings and is relieved of the pull of the belt. By this arrangement vibrations are eliminated and one of the main conditions for obtaining smoothly machined surfaces is satisfied. The spindle is hardened and ground. Thrusts are taken up by an anti-friction bearing. The front end of the spindle is designed in accordance with standard specifications and permits the face plate and driver plate or the self-centering chuck to be exchanged quickly. The gears are hardened and ground. They slide on hardened and ground multi-splined shafts.

The Speed Change is effected by three levers, one of which is arranged at the right-hand side of the headstock and two on the gear box. The speeds and positions are indicated by an operating plate in the centre of the headstock. The lever at the right-hand side of the headstock controls the 1:1, 1:8 back gears. The feeds are reversed and 8:1 gear for the cutting of steep threads engaged by means of two levers arranged also on the headstock. The headstock gears and spindle bearings are lubricated by an independent gear pump in the front leg of the machine. The movement of the spindle is transmitted through a reversing clutch and change gears to the feed and thread box.

The Feed and Thread Box affords 27 longitudinal feeds and 27 cross feeds. This number can further be increased by means of change gears. The gears are changed by means of gear change levers as well as by changing the gears on the gear quadrant. The method of selecting the speeds

Feed change gears

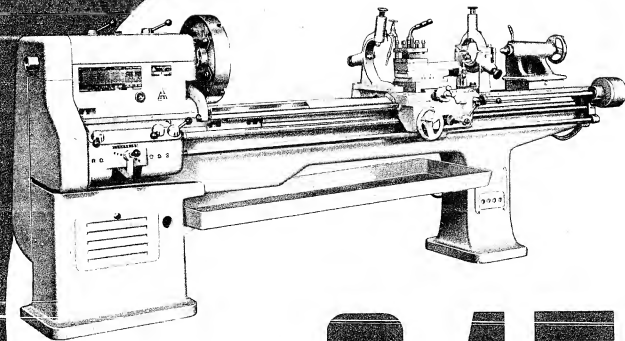
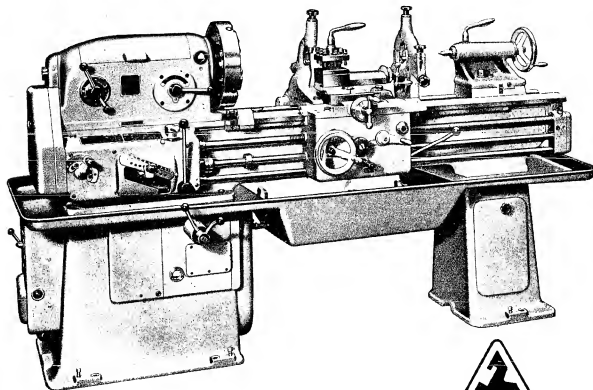


UNIVERSAL CENTER LATHES

Type

SN20

Type SN 20 Universal Center Lathes are intended for all common turning operations. They are particularly useful for applications requiring a high dimensional accuracy and a high grade of surface finish of the parts being machined. Their outstanding feature is economy in the machining of all kinds of metals both in the single part and quantity production.



Centre Lathe

MODEL

plain production lathe intended for all current operations especially in medium-size works and both with single part and series production.

are made in two sizes for the turning lengths

1500 and 2000 mm.

of 450 mm.

C45



INGENIOUS DESIGN:

ACCURACY TESTED ACCORDING TO
DR. SCHLESINGER'S LIMITS

LOW PURCHASING COSTS



C45

At its front end the main spindle runs in a precision bronzes bushed taper bearing with the provision of eliminating the play.

Thrust on spindle is taken up by an axial ball bearing.

All gears are driven off an electric motor by a flat belt or by V-belts with the provision of belt tension adjustment.

Feeds are actuated by a draw-bar, and a lead screw serves for threading.

The carriage guides on the bed are prismatic in front and flat at the rear. In front the bed ways are protected against the entrance of chips by a chip guard mounted on the longitudinal slide.

In front of face plate the bed is provided with a gap into which a removable bridge is fitted.

The machine is equipped with a cooling attachment. The coolant pump is driven off the main motor by a belt.

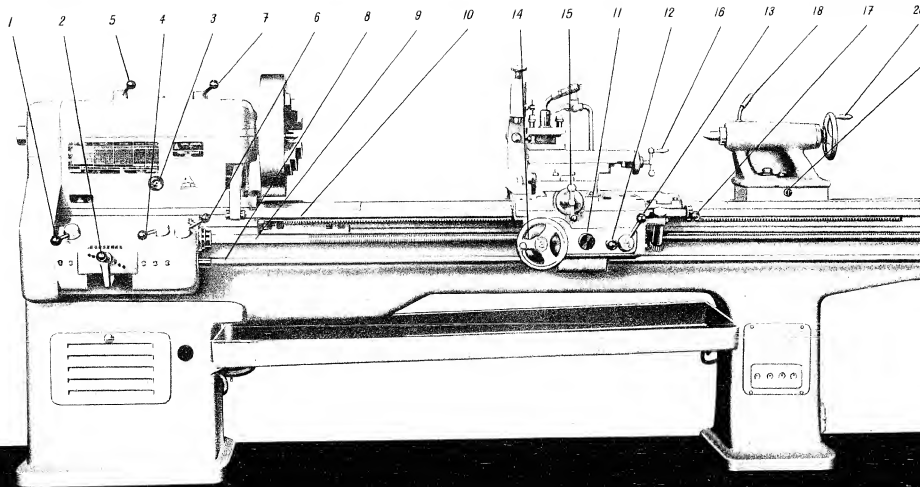
Circulation system lubrication of the headstock is provided, the plunger pump being driven by an eccentric.

Metric, Whitworth, Module and Diametral Pitch threads of all current pitches can be cut on the machine.

Starting and stopping of spindle in either direction and engaging of feeds is done by a single lever from the operating position.

Spindle speeds and feeds are easily changed.

The machine may also be arranged for line shaft drive.



**STANDARD EQUIPMENT:**

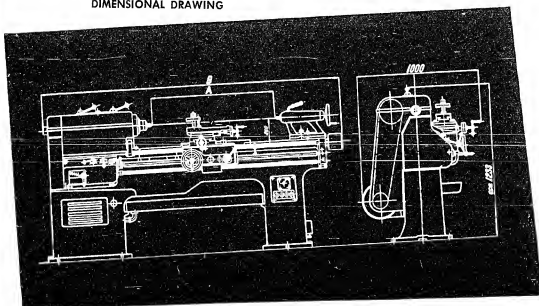
The machine is supplied with complete accessories for all current turning operations. This standard equipment is already included in the price of the machine.

Electric motor with electrical equipment, motor pulley and belt	Backplate for jaw-chuck
Four-way tool block	Lathe centres
Three-jaw self-centring chuck	Reducing sleeve
Chip pan	Set of change gears
Thread indicator	Steady rest
Spot light	Follow rest
Catch plate	Service spanners
Face plate	Operating plates
	Operator's instruction booklet

SPECIAL EQUIPMENT:

On special order and at an extra charge the machine is supplied fitted with high spindle speed range of 28—710 r. p. m.

OPTIONAL EQUIPMENT: Four-jaw self-centring chuck.

DIMENSIONAL DRAWING

C 45	A	B
1500	1500	7950
40 1/4"	59 1/4"	116"
2000	2000	8450
79"	79"	136"

SPECIFICATION:

		Metric	English
Swing over bed	mm	450	17 3/4"
Distance between centres	mm	1500—2000	59 1/4"—79"
Swing over carriage	mm	290	11 3/8"
Swing in gap	mm	630	25"
Width of gap	mm	220	8 3/4"
Width of bed	mm	330	13"
Diameter of face plate	mm	400	15 3/4"
Diameter of spindle	mm	51	2"
Taper in spindle	mm	55	5/8"
Taper of centres	Morse	4	4
Spindle nose according to		DIN 800	DIN 800
Spindle speeds: 8 in number, ranging from	r. p. m.	18—450	18—450
High speed range (on special order)	r. p. m.	28—710	28—710
Feeds: Number		54	54
Range of longitudinal feeds	mm/r	0,057—3,45	7,35—446 cuts p. in.
Range of cross feeds	mm/r	0,019—1,15	2—1335 cuts p. in.
Pitch of lead screw	t. p. i.	4	4
Threads: Number		54	54
Metric pitch	mm	0,25—8	
Whitworth	t. p. i.	2—120	2—120
Module	mm	0,25—8	
Diametral pitch		4—240	4—240
Motor: Speed	r. p. m.	1400	1400
Output	HP	4	4
Floor space required (turning length 2000 mm)	mm	1000×3450	39 1/4"×136"
For distance between centres	mm	1500 2000	59 1/4" 79"
Weight of machine: with standard equipment	kg	1500 1600	lbs. 3540 3740
with packing	kg	1650 1750	lbs. 3630 3850
with seaworthy packing	kg	1950 2100	lbs. 4300 4650
Contents boxed	m ³	4,5 5,2	cu. ft. 159 184

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE, AND FREQUENCY OF POWER SUPPLY!

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Standard equipment

Electrical installation and electric motors to suit 380 V with L. H. slide arm, feed box and automatic feed release, threading attachment and taper turning attachment.

Optional equipment

R. H. turret arm with feed box and automatic feed release.
Slide arm with feed box and automatic feed release.
Copying attachment.
Cooling attachment.
The machine is normally built for use with the metric system. On special order it can also be supplied for the work in inches and for cutting Whitworth threads.

Specification

Working Range:	Metric	English
Maximum swing when turning with side arm	mm 1250	41"
Maximum swing when turning with rail arm (with side arm lowered below table)	mm 1350	45"
Maximum vertical distance, tool holder of side arm to table	mm 850	28 1/4"
Maximum vertical distance, tool holder of rail arm to table	mm 1000	32 1/4"
Vertical travel of rail arm slide	mm 710	24"
Vertical travel of turret arm slide	mm 550	19 1/2"
Horizontal travel of side arm slide	mm 500	17 1/2"
Maximum weight of work piece	kg 4000	8820 lbs
Maximum torque on table	kgm 2250	16200 ft-lbs
Overall dimensions of machine:		
length	mm 3850	127 1/2"
width	mm 2500	82 1/2"
height	mm 4250	139 1/2"
Overall dimensions of contactor box:		
length	mm 1650	55 1/2"
width	mm 800	27 1/2"
height	mm 1800	59 1/2"

Table:	mm 1180	37 1/2"
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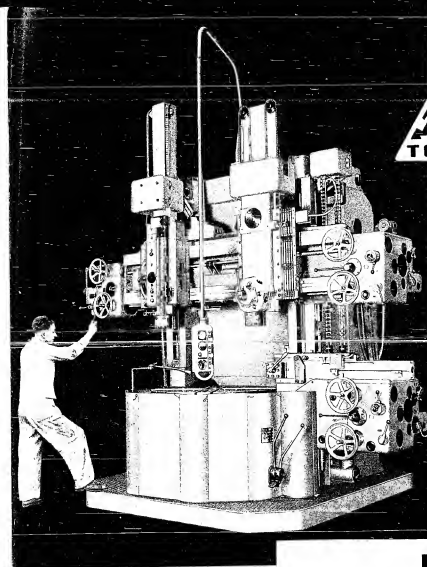
Diameter of table	mm 1180	37 1/2"
Infinately variable speed of table arranged in four ranges, for clockwise as well as counterclockwise rotation:		
range I	r. p. m. 3.55 to 14	
range II	r. p. m. 7.7 to 31	
range III	r. p. m. 15.8 to 86	
range IV	r. p. m. 37 to 150	
Power of main motor within range of table speed:		
from 3.5 to 9 r. p. m.	kW 12 to 37	
from 8 to 150 r. p. m.	kW 27 to 37	

Feeds:		
Number of feeds		24
Rate of feed, vertical as well as horizontal, per table revolution (independent for tool arm on either side of machine)	mm per rev.	0.0024" to 0.36" per min.

Main Drive:		
Variable speed commutator motor:		
Power at 2200 to 1800 r. p. m.	kW 37	
Power at 1800 to 580 r. p. m.	kW 12	
Total weight of machine in standard design, approx.	kg 15800	34800 lbs

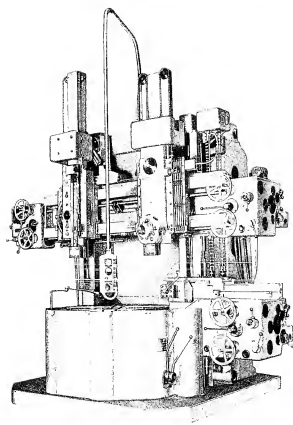
PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS.
The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.

STROJEXPORT
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**VERTICAL TURNING
AND BORING MILL
MODEL**

12



Vertical Turning and Boring Mill

The machine is built for very heavy duty and intended for the turning of external and internal cylindrical surfaces, for the turning of faces and tapers and for threading. Being the smallest type of double housing vertical turning and boring mill the machine is distinguished, in comparison with single housing machines of the same size, by its outstanding rigidity and by a large size of cut.

It is recommended to order the machine with the following equipment:

- 1) L. H. tool arm on cross rail with stop for automatic feed release.
- 2) R. H. tool arm on cross rail with turret head and automatic disengaging stop assembly for each side of turret head.
- 3) Side arm with independent feed box, with motor for rapid traverse and stop for automatic feed release.
- 4) Equipment for fine and coarse feeds (24 rates of feed) ranging from 0.06 to 0.0024" (0.0024" to 0.387" per revolution of table).
- 5) Equipment for turning tapers by means of change gears.
- 6) Equipment for cutting metric threads by means of change gears.

Outstanding Features

High cutting speed (up to 600 metres per min or 2000 ft. per min) permits tools made of hard alloys or high speed steel to be fully utilized. Infinitely variable speed permits the most suitable cutting speed to be set in the course of the machining operation without interruption. Reduction of idle times to a minimum by a reduction of the number of controls and their convenient layout. Reloading and locking of cross rail on housings for the purposes of moving it is automatic. Lubrication of all important assemblies of the machine is automatic by independent oil pumps or oil bath.

Description

The Drive. The machine is driven by a variable speed commutator motor. The gear box with four-speed back gears is built into the base and is easy to remove. The drive is controlled by push-buttons arranged on a suspended box and by two levers arranged on the base.

The Base is joined with the housings by means of large contact surfaces and forms with the girder and cross rail an enclosed frame the rigidity of which is further increased by the clamping of the cross rail to the housings.

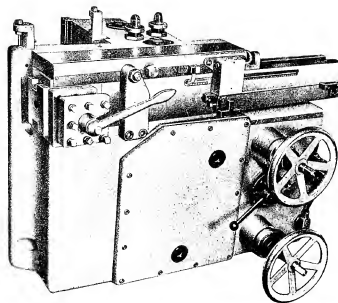
The Table has a high cross section and is heavily reinforced with ribs. It is bolted to the large spindle flange. The work is gripped by four jaws made of hardened steel.

The Spindle runs in anti-friction bearings. The size of the bearings is sufficient to carry the weight of the heaviest workpieces as well as the pressures on the tools even when the machining is done at the highest points above the table. The bearings run continuously in an oil bath. The spindle is driven from the gear box by a pinion engaging with a gear rim bolted to the table.

The Cross Rail is heavily reinforced with ribs. It is raised and lowered by an independent electric motor fitted to the girder. The clamping of the cross rail to the housings for operation and its automatic release for the purpose of moving it is done by a separate push-button controlled electric motor.

The Vertical Slide Arm is guided along the cross rail. The great height and width of the guideways ensure a smooth movement even when the slide is moved out considerably. The feeds and rapid traverses are mutually independent. The arm can be moved upwards as far as the centre of the table and downwards far enough to permit the maximum diameter to be turned with the slide tilted. The slide is balanced by a counterweight and its return part is rotated by a worm gear. Each arm has its own feed box on the cross rail for changing the rates of feed, with a motor for the rapid traverse.

Slide Arm



The feed boxes carry the hand wheels for the fine horizontal and vertical adjustment by hand, the lever for engaging the feeds and rapid traverses as well as the other control levers. All rapid traverses of the arms are disengaged in their extreme positions automatically by means of limit switches.

The Automatic Feed Release with Adjustable Stops. The vertical as well as horizontal feeds of the arm can be disengaged automatically in either direction by means of adjustable stops. When the feeds are disengaged one may, for accurate work, carry on with the hand feed to the accurately adjusted dimension. This equipment is provided on every tool arm.

The Taper Turning and Threading Equipment with Change Gears is fitted permanently to the L. H. feed box. 12 different internal or external tapers with angles ranging from 90° to 70° can be turned on the machine by means of this equipment. In conjunction with the tilted slide any internal or external taper within a range of 0° to 172° can be turned. The threads which can be cut on the machine are metric threads with pitches from 1 to 28 mm.

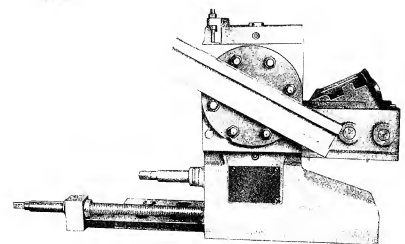
The Turret Tool Arm is supplied on the R. H. rail arm. It is equipped with a turret head for 5 tools. The head is indexed and locked by a single lever. The arm is equipped with an automatic feed release by means of adjustable stops, one for each tool. The accurate final movement to the adjusted dimension is done by hand.

The Side Arm is guided on the R. H. housing and can be lowered as far as the level of the table. It has its own feed box for the rapid traverse and is moved horizontally and vertically by pinion and racks. The side arm is balanced by counterweights. It is equipped with an automatic feed release by means of adjustable stops. The accurate final movement to the adjusted dimension is done by hand.

The Equipment for Turning Flat Tapers and Copying by Means of Taper Bar is fitted to the cross rail and sets upon the L. H. rail arm. By means of this equipment flat tapers can be turned and copying work done 50 times of a template with a swivel of 25° from the horizontal.

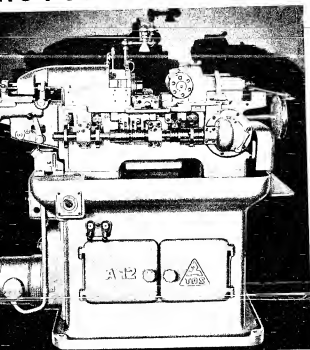
The Cooling Equipment consists of an electric motor driven pump, the necessary piping, a tank arranged below the housing, level with the floor and a guard.

Cutting Attachment



AUTOMATIC MACHINE MODEL

A12



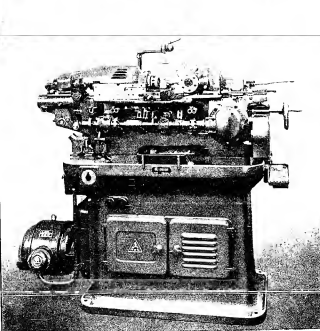
The A12 Automatic is a Heavy Duty Precision Machine which works with a permanent accuracy during its life time even under the most severe conditions. The machine incorporates numerous attachments supplied as standard equipment. By providing the machine with additional attachments and devices supplied as optional equipment its versatility will be still more increased.

STANDARD EQUIPMENT: (Supplied with each machine)

Flange mounted motor with switch and safety switch (plate current characteristics) — Left hand thread cutting attachment (built-in) — Cam for swing stop (built-in) — Attachment for indexing the turret by 2 holes (built-in) — Attachment for employing 2 cams for the turret (built-in) which considerably reduces the production times and eliminates the use of expensive, complicated cams — 2 bar rests (less stock tube) — 1 work tray for finished workpieces — 2 splash guards — set of spare parts (chain links, 2 clamping levers, 2 pressure bushes, stop dogs, shear pins, springs, etc.) — set of spindle speed change gears — set of worm gear mechanism change gears — set of clamping collars Uag 12, dia 12 mm, feeding collars Uah 12, dia 12 mm and guide bushings Uag 12, dia 12 mm — 1 cam blank for the turret Evr 20 R and 2 cam blanks for both cross slides Evr 20 S — 1 boring and tracing template for turret cams — 1 delta for cross slide cams with insert for the third cross slide — 1 template for ascertaining the cam rises and falls — set of spanners, oil can, grease gun, etc. — 1 operator's instruction booklet — 1 table for speeds and change gears.

AUTOMATIC MACHINE MODEL

A20



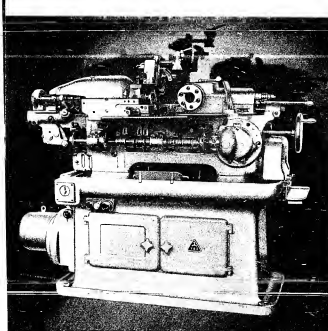
The A20 Automatic is a Heavy Duty Precision Machine which works with a permanent accuracy during its life time even under the most severe conditions. The machine incorporates numerous attachments supplied as standard equipment. By providing the machine with additional attachments and devices supplied as optional equipment its versatility will be still more increased.

STANDARD EQUIPMENT: (Supplied with each machine)

Flange mounted motor with switch and safety switch (plate current characteristics) — Left hand thread cutting attachment (built-in) — Cam for swing stop (built-in) — Attachment for indexing the turret by 2 holes (built-in) — Attachment for employing 2 cams for the turret (built-in) which considerably reduces the production times and eliminates the use of expensive, complicated cams — 2 bar rests (less stock tube) — 1 work tray for finished workpieces — 2 splash guards — set of spare parts (chain links, 2 clamping levers, 2 pressure bushes, stop dogs, shear pins, springs, etc.) — set of spindle speed change gears — set of worm gear mechanism change gears — set of clamping collars Uag 20, dia 20 mm, feeding collars Uah 20, dia 20 mm and guide bushings Uag 20, dia 20 mm — 1 cam blank for the turret Evr 20 R and 2 cam blanks for both cross slides Evr 20 S — 1 boring and tracing template for turret cams — 1 delta for cross slide cams with insert for the third cross slide — 1 template for ascertaining the cam rises and falls — set of spanners, oil can, grease gun, etc. — 1 operator's instruction booklet — 1 table for speeds and change gears.

AUTOMATIC MACHINE MODEL

A40



The A40 Automatic is a Heavy Duty Precision Machine which works with a permanent accuracy during its life time even under the most severe conditions. The machine incorporates numerous attachments supplied as standard equipment. By providing the machine with additional attachments and devices supplied as optional equipment its versatility will be still more increased.

STANDARD EQUIPMENT: (Supplied with each machine)

Flange mounted motor with switch and safety switch (plate current characteristics) — Left hand thread cutting attachment (built-in) — Cam for swing stop (built-in) — Attachment for indexing the turret by 2 holes (built-in) — 2 bar rests (less stock tube) — 1 work tray for finished workpieces — 2 splash guards — set of spare parts (chain links, 2 clamping levers, 2 pressure bushes, stop dogs, shear pins, springs, etc.) — set of spindle speed change gears — set of worm gear mechanism change gears — set of clamping collars Uag 40, dia 40 mm, feeding collars Uah 40, dia 40 mm and guide bushings Uag 40, dia 40 mm — 1 cam blank for the turret Evr 40 R and 2 cam blanks for both cross slides Evr 40 S — 1 boring and tracing template for turret cams — 1 delta for cross slide cams with insert for the cross slide — 1 template for ascertaining the cam rises and falls — set of spanners, oil can, grease gun, etc. — 1 operator's instruction booklet — 1 table for speeds and change gears.

OPTIONAL EQUIPMENT (supplied on request only):

A. Third cross slide	G. Pick-up attachment for	J. Cross drilling attachment with pick-up arm
— Chuck stock tube	Drilling attachment H	Rear end boring attachment K
B. Outside feeding attachment	Rear end boring attachment K	— Not tapping attachment
— Set of parts by means of which the out-	Cross drilling attachment with pick-up	M. Spindle locking attachment (for cross
side feeding attachment can be conver-	arm J	drilling attachment on the cross slide N)
ted into the bar inserting attachment	F. High speed drilling attachment	N. Cross drilling attachment on the cross
— Spot light	H. Sliding attachment	slide
D. Swing stop	P. Thread chasing attachment	KV. Cam inspecting attachment
E. Motor drive for:	T. Chip conveyor	FV. Cam milling attachment
High speed drilling attachment F	— Chip tray	
Sliding attachment H		
Rear end boring attachment K		
— Chip tray		

A-E Attachments recommended to each automatic. J-N Attachments used in isolated cases only. KV and FV. One of these attachments is sufficient for 8-10 automatics. G-T Attachments used rather frequently. MAGAZINE FEEDING ATTACHMENTS for machining pressings, castings, etc. These attachments are developed and supplied on special order to suit the individual operations. For cam blanks, clamping collars, feeding collars and guide bushings, toolposts and other equipment see special catalogue.

SPECIFICATIONS

CAPACITY:			
Chuck capacity, standard	mm	40	1 1/2"
Chuck capacity with outside feeding	mm	46	1 3/4"
Maximum feed length	mm	100	3 1/2"
Maximum diameter of thread cut in steel	mm	28	1 1/8"
Maximum diameter of thread cut in brass	mm	36	1 1/2"
Production time with standard equipment	sec.	4-30	
Maximum distance, turret to spindle end	mm	68	2 3/4"
Maximum stroke of turret (turning length)	mm	80	3 1/8"
Maximum drilling depth when indexing the turret in its rear position	mm	80	3 1/8"
Maximum drilling depth when indexing the turret in its front position	mm	65	9/16"
SPINDLE:			
16 spindle speeds for turning in the range of	R.p.M.	320-2000	
16 speed rates for threading in the range of	R.p.M.	75-1010	
Ratio of turning to threading with standard equipment		2:1 4:1 8:1	
TURRET HEAD:			
6 tool holes dia.	mm	25	1"
or on request in inches	mm	190	7 1/2"
Maximum distance, tool end to centre of turret	mm	190	7 1/2"
CROSS SLIDES:			
Maximum stroke of cross slides	mm	45	1 3/4"
DRIVE:			
Output of motor	kW	4	
Floor space required	cm	190/70 75/28"	
Weight of machine	kg	1520	3300 lbs

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OPTIONAL EQUIPMENT (supplied on request only):

A. Third cross slide	G. Pick-up attachment for	J. Cross drilling attachment with pick-up arm
— Chuck stock tube	Drilling attachment H	Rear end boring attachment K
B. Outside feeding attachment	Rear end boring attachment K	— Not tapping attachment
— Set of parts by means of which the out-	Cross drilling attachment with pick-up	M. Spindle locking attachment (for cross
side feeding attachment can be conver-	arm J	drilling attachment on the cross slide N)
ted into the bar inserting attachment	F. High speed drilling attachment	N. Cross drilling attachment on the cross
— Spot light	H. Sliding attachment	slide
D. Swing stop	P. Thread chasing attachment	KV. Cam inspecting attachment
E. Motor drive for:	T. Chip conveyor	FV. Cam milling attachment
High speed drilling attachment F	— Chip tray	
Sliding attachment H		
Rear end boring attachment K		
— Chip tray		

A-E Attachments recommended to each automatic. J-N Attachments used in isolated cases only. KV and FV. One of these attachments is sufficient for 8-10 automatics. G-T Attachments used rather frequently. MAGAZINE FEEDING ATTACHMENTS for machining pressings, castings, etc. These attachments are developed and supplied on special order to suit the individual operations. For cam blanks, clamping collars, feeding collars and guide bushings, toolposts and other equipment see special catalogue.

SPECIFICATIONS

CAPACITY:			
Chuck capacity, standard	mm	20	3/4"
Chuck capacity with outside feeding	mm	26	1 1/8"
Maximum feed length	mm	80	3 1/8"
Maximum diameter of thread cut in steel	mm	14	1/2"
Maximum diameter of thread cut in brass	mm	18	3/4"
Production time of 1 workpiece	sec.	29-300	
SPINDLE:			
8 spindle speeds for turning in the range of	R.p.M.	320-2000	
16 speed rates for threading in the range of	R.p.M.	45-2000	
Ratio of turning to threading with standard equipment		1:7:1 2:3:5 3:4:7 4:9:1 8:9:1	
Ratio of turning to threading, on request		11:0:1 14:1	
When using a pole-changing motor for 2 speeds the number of speeds both for turning and threading is doubled. Also the ratio of turning to that of threading is increased up to		21:5:1	
TURRET HEAD:			
6 tool holes dia.	mm	20	3/4"
or on request in inches	mm	155	6 1/8"
Maximum overhang of tool from centre of turret	mm	55	2 1/8"
Maximum distance, spindle end to turret	mm	150	5 7/8"
Maximum stroke of turret (turning length)	mm	60	2 3/8"
Drilling depth	mm	60	2 3/8"
CROSS SLIDES:			
Maximum stroke of cross slides	mm	35	1 3/8"
DRIVE:			
Output of motor	kW	2.55	
Speed of motor	R.p.M.	1440	
When using the pole-changing motor:			
Output	kW	26.17	
Speed	R.p.M.	1440/940	
Floor space required	cm	155/70 61" x 28"	
Weight of machine	kg	1100	2420 lbs

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OPTIONAL EQUIPMENT (supplied on request only):

A. Third cross slide	Rear end boring attachment K	T. Chip conveyor
— Chuck stock tube	Not tapping attachment L	— Chip tray
B. Outside feeding attachment	G. Pick-up attachment for	J. Cross drilling attachment with pick-up arm
— Set of parts by means of which the out-	Sliding attachment H	K. Rear end boring attachment
side feeding attachment can be conver-	Rear end boring attachment K	L. Not tapping attachment
ted into the bar inserting attachment	Not tapping attachment L	M. Spindle locking attachment (for cross
— Spot light	Cross drilling attachment with pick-up	drilling attachment on the cross slide N)
D. Swing stop	arm J	N. Cross drilling attachment on the cross
E. Motor drive for:	F. High speed drilling attachment	slide
High speed drilling attachment F	H. Sliding attachment	KV. Cam inspecting attachment
Sliding attachment H	P. Thread chasing attachment	FV. Cam milling attachment

A-E Attachments recommended to each automatic. J-N Attachments used in isolated cases only. KV and FV. One of these attachments is sufficient for 8-10 automatics. G-T Attachments used rather frequently. MAGAZINE FEEDING ATTACHMENTS for machining pressings, castings, etc. These attachments are developed and supplied on special order to suit the individual operations. For cam blanks, clamping collars, feeding collars and guide bushings, toolposts and other equipment see special catalogue.

SPECIFICATIONS

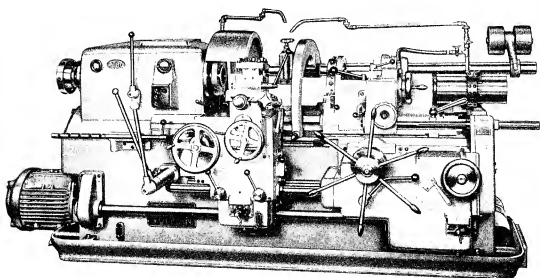
CAPACITY:			
Chuck capacity, standard	mm	12	1/2"
Chuck capacity with outside feeding	mm	16	5/8"
Maximum feed length	mm	80	2 3/4"
Maximum diameter of thread cut in steel	mm	12	1/2"
Maximum diameter of thread cut in brass	mm	16	5/8"
Production time of 1 workpiece	sec.	29-300	
SPINDLE:			
8 spindle speeds for turning in the range of	R.p.M.	712-4574	
16 speed rates for threading in the range of	R.p.M.	48-2000	
Ratio of turning to threading with standard equipment		2:0:1 3:2:1 4:5:1 7:2:1	
Ratio of turning to threading on request		9:1:1 11:7:1 14:8:1	
TURRET HEAD:			
6 tool holes dia.	mm	20	3/4"
or on request in inches	mm	155	6 1/8"
Maximum overhang of tool from centre of turret	mm	55	2 1/8"
Maximum distance, spindle end to turret	mm	150	5 7/8"
Maximum stroke of turret (turning length)	mm	60	2 3/8"
Drilling depth	mm	60	2 3/8"
CROSS SLIDES:			
Maximum stroke of cross slides	mm	35	1 3/8"
DRIVE:			
Output of motor	kW	2.55	
Speed of motor	R.p.M.	1440	
Floor space required	cm	155/70 61" x 28"	
Weight of machine	kg	1020	2240 lbs

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TURRET LATHE MODEL VOLMAN RT 80



HIGH DUTY PRECISION MACHINE FOR QUANTITY PRODUCTION OF PARTS FROM BAR STOCK AS WELL AS FOR SINGLE PIECE WORK, DESIGNED AND BUILT TO TAKE FULL ADVANTAGE OF CARBIDE TIPPED TOOLS

THE WORK SPINDLE is driven by a flanged type two-speed electric motor. The six multi-plate clutches in the gearbox and the pole-changing of the main drive motor enable 8 spindle speeds in both directions while cutting. By means of change gears 3 spindle speed ranges can be obtained. The work spindle rotates in accurately adjustable precision anti-friction bearings.

THE FEED MECHANISM for the turret and cut-off slide is powered from the work spindle through change gears and a gearbox.

THE TURRET SLIDE. The turret provided with 16 tool holes revolves about its horizontal axis. The longitudinal and cross feeds are effected both by hand and by power. The cross feed is obtained by the rotary motion of the turret. Adjustable stops are provided for limiting the longitudinal and cross feeds. The power feeds are automatically disengaged by stops. Safety couplings protect the machine against overload.

THE CUT-OFF REST with the four-way tool block is declined by 10° so as not to interfere with the tools clamped in the turret. Thus simultaneous operation both of the turret slide and the cut-off rest is enabled. The longitudinal and cross feeds are effected manually and by power. The power feeds are automatically released by stops.

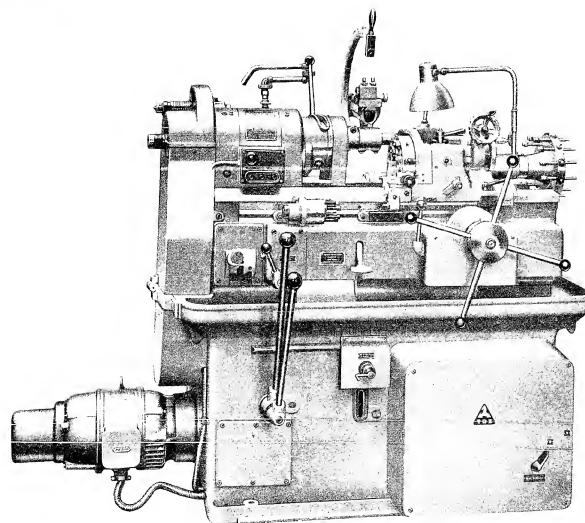
THE BAR FEED ATTACHMENT is controlled by a hand-operated spider for feeding the feeding head along with the bar by means of a chain. The bar is clamped in the feeding head by gripping jaws.

THE THREAD CHASING ATTACHMENT permits the cutting of all classes of internal and external threads with the aid of a leader.

LUBRICATION. The work spindle bearings are lubricated from an individual oil tank in the top cover of the headstock. The transmission mechanism in the headstock has circulation system lubrication, the oil being supplied by a special geared pump. The turret slide and the cut-off rest are oiled by hand-operated grease guns.

COOLING-SYSTEM. The coolant tank is housed inside the column. A liberal supply of coolant is provided by a gear pump.

WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!



TURRET LATHES Models RT 26-34

Heavy Duty High Speed Precision Machines for the quantity production of parts from bar stock, as well as for the single part production, designed and built to take full advantage of hard alloy cutting tools within lifetime.

THE WORK SPINDLE is driven by V-belts through the gearbox from a flange-mounted two-speed motor. Four multiple disc clutches in the gearbox and the pole changing switch of the main drive motor enable the engaging of four spindle speeds in either direction of rotation while the machine is cutting. Two different spindle speed ranges are obtained by employing two change gears. The work spindle runs in accurate, finely adjustable anti-friction bearings.

THE FEED MECHANISM is driven by a V-belt from the work spindle and consists of the quick change gearbox and the apron with a tripping worm.

TURRET SLIDE. The turret has twelve tool holes and rotates about its horizontal axis. The longitudinal feed is by hand and by power with automatic release. The cross feed is only by hand and proceeds by the rotary movement of the turret. Adjustable stops are provided for limiting the longitudinal and cross feed of the tools.

THE STOCK FEEDING ATTACHMENT is operated by a hand lever. The feeding collet has interchangeable jaws to suit the different bar dimensions.

THE THREAD CHASING ATTACHMENT enables the cutting of all classes of external and internal threads with the aid of a leader.

LUBRICATION. All gears in the gearbox and apron are lubricated by a gear pump, the work spindle bearings by a hand grease gun. The turret slides and the other movable parts are lubricated by a hand pump.

COOLING. The coolant tank is housed inside the machine base. The coolant is supplied by a gear pump.

STANDARD EQUIPMENT:
2 guards, central and side cross stops, set of spanners, hand grease gun, electric motor for 220, 380 or 500 volts, electrical equipment, spot light, operator's instruction booklet and operating plates.



	RT 26	RT 34
Bar capacity	26 1.02"	34 1.34"
Bore of spindle	28 1.1"	36 1.41"
Taper in spindle	metric	metric
Swing over bed: a) with thread chasing attachment	225 8.8"	225 8.8"
b) without thread chasing attachment	340 13.4"	340 13.4"
Max. chuck capacity	110 4.3"	110 4.3"
Dia. of chuck	110 4.3"	110 4.3"
Max. distance: a) turret to flange of work spindle	440 17.3"	435 17.1"
b) turret to chuck for bar stock	390 14.9"	375 14.7"
Dia. of turret	200 7.9"	200 7.9"
Pitch line diameter of tool holes	135 5.3"	135 5.3"
Number of tool holes	12 12	12 12
Diameter of tool holes	15, 30, 35	15, 30, 35
Longitudinal travel of turret slide	440 17.3"	435 17.1"
Spindle speeds: Number	8 8	8 8
Range	375-4200	315-3500
Number of feeds	3 3	3 3
Range of longitudinal feeds	0.028-0.09	0.028-0.09
Motor: Speed	R. p. M. 1500 3000	R. p. M. 1500 3000
Output	3.6 2.6	3.6 2.6
Floor space required	850x1900 33.5'x75'	850x1900 33.5'x75'
Length of machine with stock feeding attachment and floor stands	4540 178"	4540 178"
Weight of machine: with standard equipment	950 2103 lbs.	950 2100 lbs.
with packing	1100 2420 lbs.	1100 2420 lbs.
with seaworthy packing	1175 2600 lbs.	1175 2600 lbs.
Contents boxed	3.2 113 cu. ft.	3.2 113 cu. ft.

OPTIONAL EQUIPMENT RECOMMENDED TO EACH MACHINE:

For RT 26	For RT 34
Va Quick-clamping chuck for bar stock	Va Right-hand cross stop
Vb Silent stock tube with floor stand	Vb Transverse copying attachment including holder of copying roller
Vc Longitudinal copying attachment	Vc Drum length stop
Vd Hold-down for copying attachment	Vd Special stop
Ve Central stop	Ve Cooling attachment
Vf Left-hand cross stop	Vf Change gears

OPTIONAL EQUIPMENT USED RATHER FREQUENTLY:

Via Change turret	Via Thread cutting with die head (if thread chasing attachment not available)
Vna Turret puller	Vna Thread cutting with die head (if thread chasing attachment not available)
Vna Thread chasing attachment	

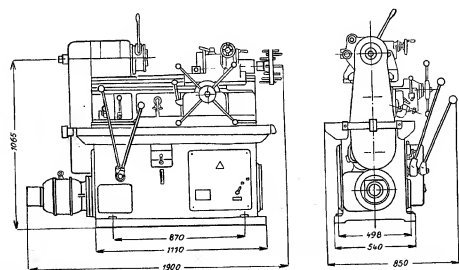
OPTIONAL EQUIPMENT MADE AND SUPPLIED ON REQUEST ONLY:

Via Multiple thread cutting attachment (if thread chasing attachment is not available)	Vna Cooling oil injection — If supporting tailstock available
Vna Supporting tailstock for machines without thread chasing attachment	Vna Clamping chuck for accurate centering and small diameter stock
Vpa Oil supply to the turret	Vna Change pulley for feed changing
Via Coating oil injection — If supporting tailstock not available	Vna Backplate with 3-jaw chuck die 100 mm

For turret tool-holders see special list.

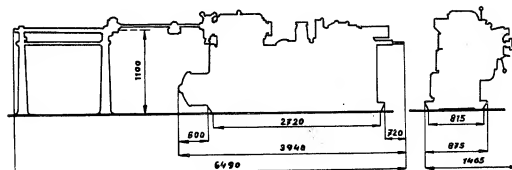
IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT
PRAHA — CZECHOSLOVAKIA



SPECIFICATIONS:

Bar capacity	mm	80	3 1/8"
Bore of spindle	mm	82	3 1/8"
Taper in spindle	metric	90	90
Swing over bed: a) with thread chasing attachment	mm	530	21"
b) without thread chasing attachment	mm	530	21"
Chuck capacity	mm	330	13"
Maximum distance: a) turret to flange of main spindle	mm	900	35 3/8"
b) turret to chuck for bar stock	mm	730	28 3/4"
Diameter of turret	mm	390	15 3/4"
Pitch line diameter of tool holes	mm	270	10 5/8"
Number of tool holes	mm	16	16
Diameter of tool holes	mm	20 40 65	20 40 65
Spindle speeds: number	mm	24	24
range	r. p. m.	18-900	18-900
Feeds: number	mm/rev.	12	12
range of longitudinal feeds	mm/rev.	0.06-1.8	0.06-1.8
range of cross feeds	mm/rev.	0.04-1.2	0.04-1.2
Main drive motor: Speed	r. p. m.	1000/1500	1000/1500
Output	HP	10/13.5	10/13.5
Floor space required	mm	1160x3940	46"x155"
Length of machine with bar feed attachment and floor stands	mm	6490	255"
Weight of machine: with standard equipment	kg	4200	9,280 lbs
with packing	kg	4500	10,000 lbs
with seaworthy packing	kg	5300	11,700 lbs
Contents boxed	m ³	10	353 cu. ft.

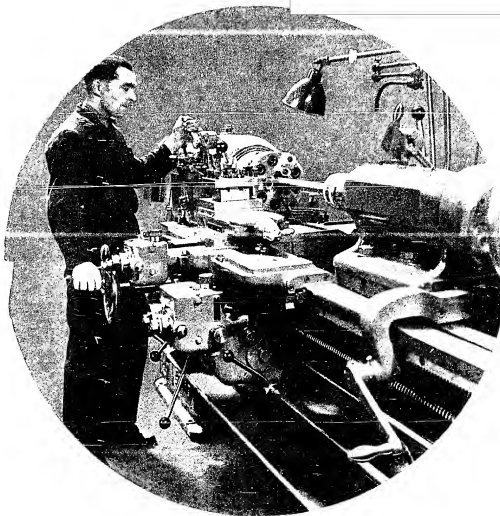


STANDARD EQUIPMENT: 3 guards, 1 chuck guard, left-hand, central and right-hand cross stop, change gears, hand-operated grease gun, various spare screws, set of spanners, tool pan, operating plates, operator's instruction booklet.

OPTIONAL EQUIPMENT: chuck with collet chuck for bar stock, quick action chuck for finishing jobs, 3-jaw universal scroll chuck with backplate, cross slide with four-way tool block, bar feed attachment with special bar chuck and floor stands with standard stock-tube, centering screw chuck, longitudinal copying attachment, hold-down attachment for longitudinal copying jobs, transverse copying attachment, drum length stop, special length stop, thread chasing attachment with 1 leader and 1 follower, swing arm for die heads, supporting tailstock, high-speed drilling attachment with motor, coolant supply for the internal cooling for machines without tailstock, coolant supply for machines with tailstock, cooling attachment with piping and drive, change turret, electric motor for 220/380 or 500 volts, electrical equipment, spot light without bulb.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

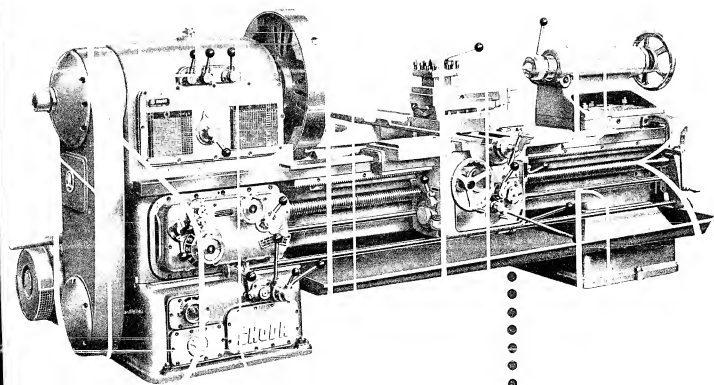
STROJEXPORT PRAHA — CZECHOSLOVAKIA



CENTER LATHES

TYPE

STROJEXPORT



ŠKODA — CENTER LATHES TYPE

These machines are built for specially heavy duty and satisfying the latest demands placed on economical machining of steel as well as of other metals. Thanks to their rigidity, range and steps of spindle speeds and exceptionally high power of motor they permit economical machining with cemented carbide tipped tools. They are highly reliable in operation and maintain their precision.

Their outstanding features are:

Wide range of main spindle speeds arranged in fine steps.

Precision mounting of the main spindle.

Large number of rates of longitudinal and cross feeds arranged in fine steps.

Possibility of cutting metric, Whitworth, Module, Diametral Pitch and Circular Pitch Threads.

Favourable distribution of weights with a relatively low weight and high stability of the machine.

Variety of optional equipment and attachments of the machine which increase its precision, output and versatility.

DESCRIPTION

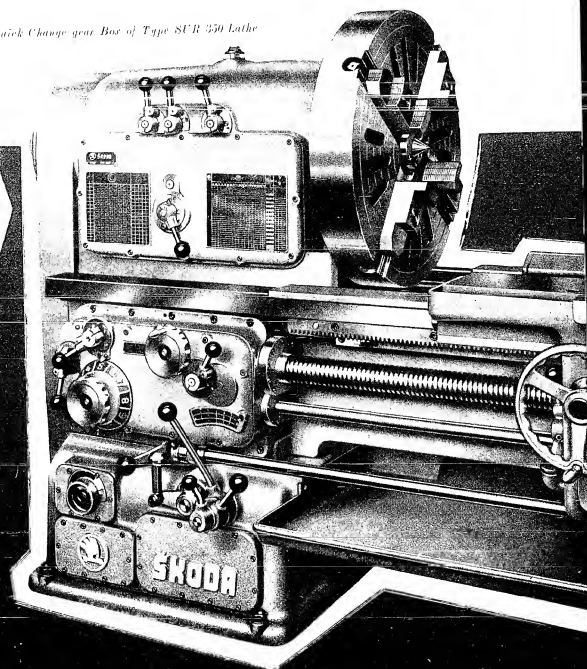
RANGE OF SPINDLE SPEEDS.

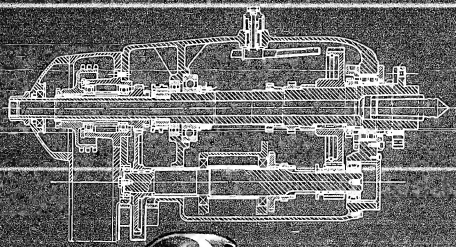
The wide overall range of main spindle speeds (1:130) is divided into fine steps and comprises 32 speeds. Sufficiently high and low speeds are available to permit the use of cemented carbide tipped tools as well as screwcutting with tools made of tool steel. The speeds are arranged in two ranges which are changed by changing the number of poles of the two-speed motor.

MAIN SPINDLE.

The massive flanged end of the main spindle ensures a rigid mounting of the face plate or chuck, which will not work itself loose even if the spindle is reversed at the highest speed or if the brake is applied suddenly. The end of the spindle is surface hardened to protect it from damage when the face plate is being removed.

Headstock and Quick Change gear Box of Type ŠUR 370 Lathe





Mounting of Spindle

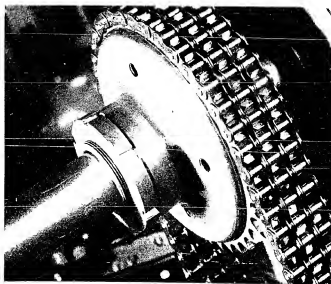
MOUNTING OF SPINDLE

The spindle runs at its front end in a double-row precision roller bearing the play of which can be adjusted. The rear bearing is a ball bearing with a longitudinal adjustment.

Inside View of Headstock.

MAIN SPINDLE DRIVE.

The spindle is driven by a triple roller chain which runs in an oil bath so that it operates noiselessly. The fact that the main spindle is completely relieved of the pull of the chain eliminates adverse effects upon the precision of the work of the machine. Half of the speeds operate with the back gears out of engagement. The spindle is driven by the chain directly which results in a high grade of surface finish of the workpiece.

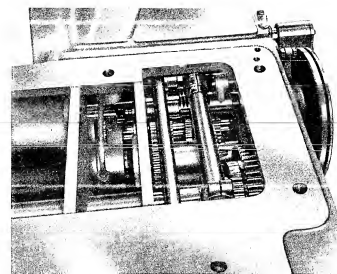
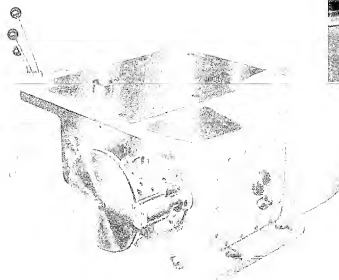


Chain Drive of Spindle.



GEAR ASSEMBLY.

The location of the gear assembly apart from the headstock in the leg of the machine contributes to the smooth operation of the machine and eliminates unfavourable influences of temperature.



Gear Box.

MAIN CLUTCH.

The main clutch is of the multi-plate type. It is of generous dimensions and permits the machine to be started smoothly without jerks in either direction. The starting lever on the apron box engages the clutch in its extreme positions. In its centre position it disengages the clutch and applies the brake at the same time. The lubrication of the clutch is automatic.

CHANGE GEARS.

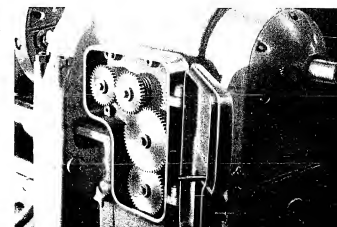
The change gears are mounted on spline shafts at the rear of the headstock. The shafts run in anti-friction bearings and are lubricated by an oil bath. The change of gears is quick because the movement of the gears into mesh by turning the quadrant is dispensed with.

QUICK CHANGE GEAR BOX.

The quick change gear box is completely enclosed without any slot for the gear change lever which, on other machines, makes sealing impossible. All commonly used thread pitches and rates of feed can be directly engaged by the levers of the quick change gear box. By changing the change gears a number of other thread pitches and rates of feed becomes available. The total number of thread pitches and rates of feed is considerably larger than on machines of other makes. A total of 110 metric, 90 Whitworth, 88 Module, 77 Diametral Pitch and 99 Circular Pitch threads can be cut on the machine.

BRAKE.

An efficient brake, which stops the machine, makes operation quicker. It is arranged outside the gear box so that the heat generated when the brake is applied is not transmitted to the machine. This contributes to the maintenance of precision of the machine.



Change Gears.

Layout of Controls

- | | | | |
|--|--|---|---|
| 1. Change of Standard Feeds (in conjunction with lever 3). | 8. Four-Way Tool Post Locking Lever. | 16. Engagement, Reversing and Disengagement of Main Spindle. | 22. Longitudinal Hand Feed of Carriage. |
| 2. Change of Standard Feeds (engagement of back gears). | 9. Clamping of Carriage to Bed. | 17. Power Feed of Carriage, Transverse or Longitudinal. | 24. Speed Change of Main Spindle (in conjunction with lever 6). |
| 3. Change of Standard Feeds (engagement of back gears). | 10. Hand Feed of Top Carriage Slide. | 18. Levers for Lifting of Stops in Apron Box. | 25. Same as 16 (auxiliary lever used chiefly for changing spindle speeds). |
| 4. Feed Reversing or R. H. L. H. Thread Change Lever. | 11. Locking of Tailstock Sleeve. | 19. Control Lever of Coupling for Hand Disengagement and Engagement of Transverse or Longitudinal Feed. | 26. Hand Wheel on Quick Change Gear Box for Releasing and Locking of Dial (27). |
| 5. Coarse and Standard Feed or Steep and Standard Thread. | 12. Tailstock Locking Screws. | 20. Closing or Opening of Chasp Nut. | 27. Dial on Quick Change Gear Box for Sliding of Intermediate Gear over Quick Change Gear Sets. |
| 6. Back Gears Control Lever for Change of Speeds. | 13. Transverse Movement of Tailstock for Turning Slender Tapers. | 21. Hand Feed of Cross Slide. | 28. Electric Motor Starting and Pole Changing. |
| | 14. Fine Adjustment of Tailstock Sleeve. | | |

24 26 7 6 3 4 5 23 22 21 20 19 8 18 9 17 10 16 11 12 13 14 15

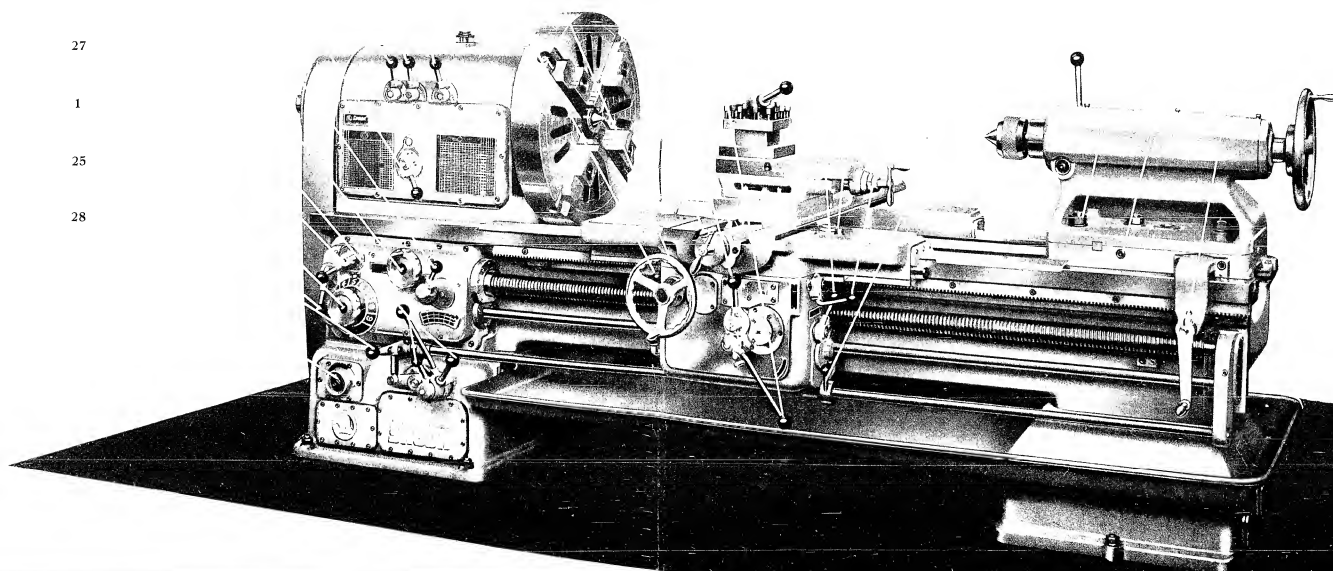
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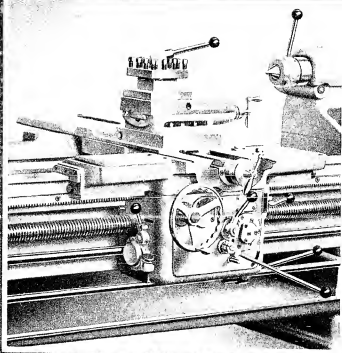
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25

28





Carriage with Rear Tool Post Supplied as Optional Equipment.

CARRIAGE.

The carriage is exceptionally rigid. The long guideways of the longitudinal slide reduce the specific pressure on the sliding surfaces. Their wear is therefore very small. The sliding surfaces are, in addition, covered by steel guards on both sides of the carriage.

LEAD SCREW.

The lead screw is guided underneath the front guideway of the bed so that it is protected from falling chips.

APRON BOX.

The apron box is equipped with automatic disengagement of the longitudinal and transverse feed by a positive stop. The machine is protected against overload by

a safety coupling which disengages the feed automatically when the pressure of the tool or the pressure caused by some obstruction exceeds a certain limit. The coupling of the automatic disengagement of the feed is provided with a large number of dogs so that its engagement is practically instantaneous.

LUBRICATION.

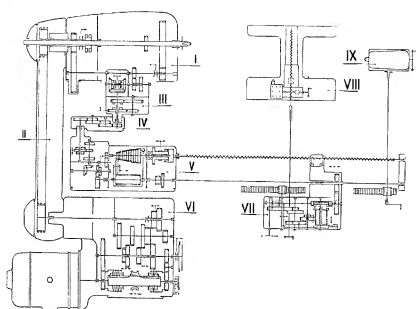
The entire machine is centrally lubricated by a gear pump fitted in the gear box. The pump supplies oil to all the parts of the machine. It is started when the main motor is started.

Only the apron box is lubricated independently by its own automatic oil pump. The number of lubricating points which have to be lubricated by hand is exceptionally small.

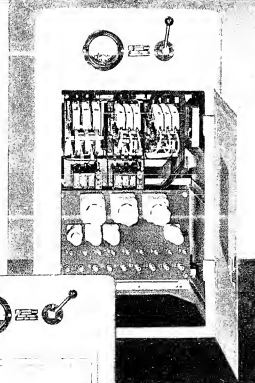
COOLING.

The cooling equipment consists of an electric motor driven pump fitted at the rear of the machine which supplies coolant through a telescopic tube to the point of work.

Diagram of the Drive of the Machine.



- I. Headstock.
- II. Chain Drive.
- III. Feed Box.
- IV. Change Gear Box.
- V. Quick Change Gear Box.
- VI. Gear Box.
- VII. Apron Box.
- VIII. Carriage.
- IX. Tailstock.



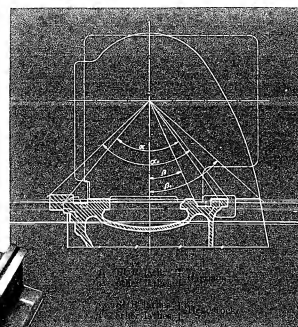
Electric Switchgear Cabinet.

ELECTRICAL EQUIPMENT.

The modern electrical equipment which includes contactors and protective equipment is built into a special cabinet separate from the machine. The load of the machine may be observed on an ammeter.

BED.

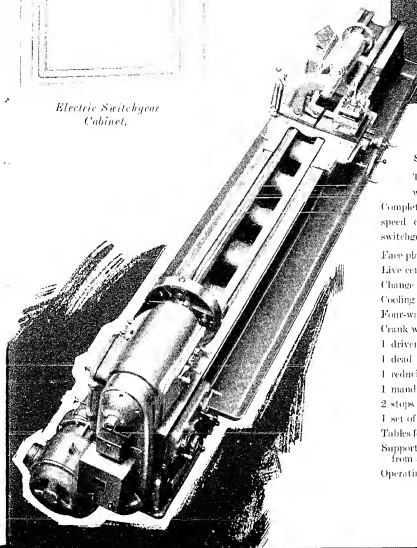
The bed, which is particularly rigid, is provided with massive guideways for the carriage. It does not vibrate even at the heaviest load of the machine. The large elliptic holes between the stiffening ribs afford an easy passage for the chips. The guiding surfaces are wide, ground and scraped. The sketch shows that the method of taking up the load from the bed is more favourable than in the case of lathes of other makes.



STANDARD EQUIPMENT.

The machine is supplied with the following equipment which is included in the price:

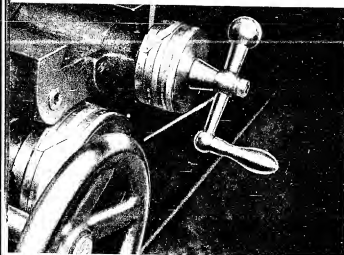
- Complete electrical equipment including flange-mounted two-speed electric motor, electric motor for coolant pump, electric switchgear cabinet, main motor control switch and electric wiring.
- Face plate.
- Live center for tailstock.
- Change gears.
- Cooling equipment.
- Four-way tool post.
- Crank with gear for movement of tailstock.
- 1 driver plate.
- 1 dead center.
- 1 reducing sleeve (metric 70 No. 5 Morse) for main spindle.
- 1 mandrel for fitting of face plate.
- 2 stops for limiting longitudinal travel of carriage.
- 1 set of spanners for attendance of machine.
- Tables for speeds, rates of feed, threads and attendance of machine.
- Supports of lead screw and feed shaft (supplied for turning lengths from 3 meters (9' 10" approx)).
- Operating instructions of machine.



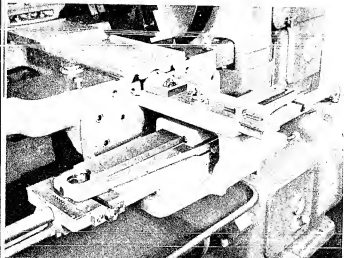
OPTIONAL EQUIPMENT

The following equipment is available to special order and against extra charges:

REAL TOOL POST fitted to a common slide, easily removable.



Double Indexing Scales, Longitudinal and Transverse



Taper Turning Attachment

SMALL STEADY REST with three jaws with rollers running in anti-friction bearings.

LARGE STEADY REST of identical design but for larger diameters.

FOLLOW REST with three jaws, two of which fitted rollers running in anti-friction bearings, the bottom jaw with a sliding bearing surface.

DOUBLE INDEXING SCALE OF LONGITUDINAL TRAVEL fitted on the apron box and indicating the travel through which the carriage has passed in tenths of millimeters.

DOUBLE INDEXING SCALE OF CROSS TRAVEL of similar design as longitudinal scale and indicating the travel through which the cross-slide has passed in 0.05 mm.

THREAD INDICATOR permitting the start of the thread to be identified for taking another cut.

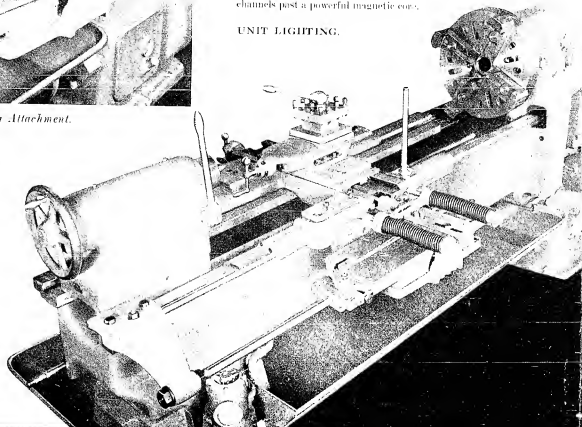
TAPER TURNING ATTACHMENT, easy to fit to the rest of the carriage, intended for the turning of tapers up to 700 mm (27 1/2") long and up to an angle of 10° in either direction.

COPYING ATTACHMENT. Serves for external as well internal copying of various shapes from a template up to a length of 500 mm (23 1/2") and a depth of 100 mm (3 5/8"). The simplicity of parts is common for the copying and taper turning attachments. It is therefore recommended to order both attachments together. The changeover from the copying attachment to the taper turning attachment is very simple.

CHAMFERING ARM permits chamfering while turning is in progress.

MAGNETIC FILTER for lubricating oil. Separates even the minutest ferro-magnetic particles from the oil as it flows through channels past a powerful magnetic core.

UNIT LIGHTING.



LONGITUDINAL FEED DISENGAGING BOX AND CROSS FEED DISENGAGING BOX.

The longitudinal and cross feeds can be limited by automatic disengaging boxes with an accuracy of 0.01 mm (0.0001") which eliminate the difficulties encountered in keeping the longitudinal measures within specified tolerances. The disengaging boxes are controlled by the disengaging mechanism of the apron box. They disengage without shock because the positive stops operate at low pressures. They permit any of the 12 longitudinal or cross feed stops to be set quickly so that their use considerably increases the output of the lathe and it is economical to set them even if only a single piece is to be machined.

The boxes are independent units and can easily be fitted to new as well as to previously supplied SKODA lathes of the types SER 260, SER 300, SER 350 and SER 400 with serial numbers from 018 10 742 upward.

PNEUMATIC CHUCK.

Intended for quick over-rigging of the workpiece, it consists of a chucking cylinder, a pneumatic control valve and a three-jaw chuck. This equipment, together with the feed disengaging boxes permits the lathe to compete in performance, for certain kinds of work, with the heavier turret lathes being at the same time, more accurate, more rigid and having, in fact, a larger output if cemented carbide tipped tools are used. The chuck is provided with two sets of jaws for external and one set of jaws for internal chucking.

Outside Diameter of Chuck	M	N	O	P	Inside Chucking Diameter R	S
10 to 60 mm	12 3/32" to 2 23/64"	20 to 120 mm	2 49/64" to 6 11/16"	80 to 180 mm	3 5/32" to 7 5/64"	200 to 250 mm
250 mm	20 to 100 mm	180 to 220 mm	6 5/16" to 8 31/32"	180 to 240 mm	7 3/32" to 10 13/64"	10 1/4" to 11 27/64"
9 27/32"	1 31/32" to 3 29/64"	120 to 225 mm	220 to 325 mm	80 to 180 mm	180 to 240 mm	300 to 350 mm
315 mm	20 to 125 mm	145 5/8" to 8 27/32"	8 43/64" to 12 25/32"	3 5/32" to 7 5/64"	7 3/32" to 11 13/64"	11 33/64" to 12 25/32"
12 13/16"	51 5/8" to 1 29/32"	110 to 160 mm	280 to 410 mm	85 to 208 mm	208 to 228 mm	328 to 400 mm
160 mm	20 to 110 mm	200 to 300 mm	3 23/64" to 6 10/64"	7 7/8" to 12 1/32"	11 1/64" to 16 3/32"	3 23/64" to 8 2 3/16"
15 3/4"	51 5/8" to 5 1/2"	7 7/8" to 12 1/32"	11 1/64" to 16 3/32"	3 23/64" to 8 2 3/16"	8 13/64" to 12 57/64"	12 29/32" to 18 7/64"

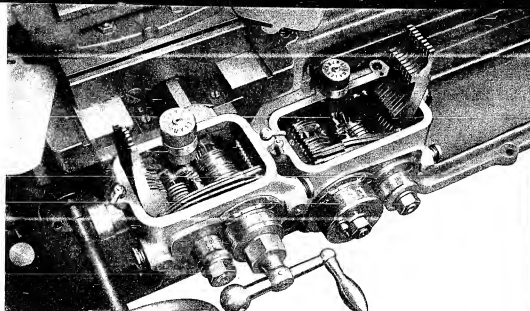
PNEUMATIC RAPID RETURN OF CARRIAGE

Considerably facilitates operation and reduces idle times.

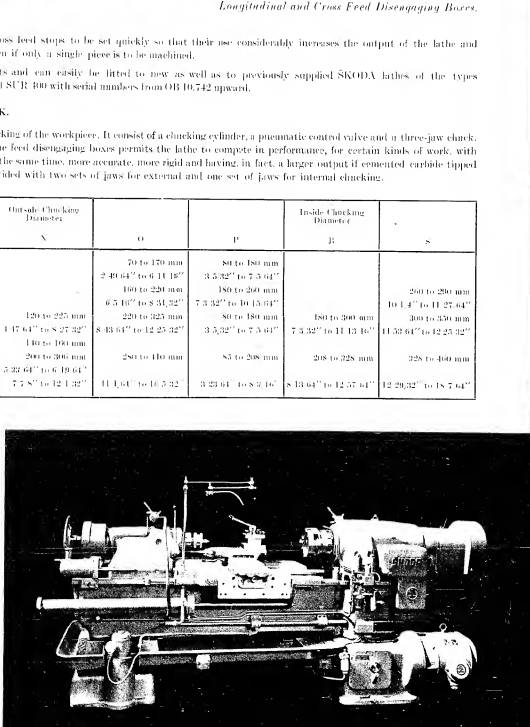
PNEUMATIC MOVEMENT OF TAIL STOCK SLEEVE

Makes setting up of work-piece considerably easier.

General Rear View of Machine Equipped with Pneumatic Movement of Tailstock Sleeve, Rapid Return of Carriage and Pneumatic Chuck.



Longitudinal and Cross Feed Disengaging Boxes.



SPECIFICATION

SUR 250 SUR 300 SUR 350 SUR 400

WORKING RANGE:

Height of centers above bed	mm	200	300	350	400
Maximum turning length	mm	0 to 1000	0 to 1500	0 to 1500	0 to 1500
Maximum swing: up to 300 mm (11 3/4") from spindle	mm	250	300	350	400
over bed	mm	350	400	450	500
over standard carriage	mm	300	350	400	450
over double carriage	mm	250	300	350	400
Maximum cross section of tool	mm	10 to 40	10 to 40	10 to 40	10 to 40
Diameter of face plate	mm	100	120	150	180
Chucking rings, diameter	mm	50 to 180	50 to 200	50 to 200	50 to 200
3- or 4-jaw chuck, dia. as required by customer	mm	250	300	350	400
Steady rests: small design, diameter	mm	50 to 200	50 to 200	50 to 200	50 to 200
large design, diameter	mm	100 to 250	100 to 250	100 to 250	100 to 250
Follow rest, diameter	mm	50 to 200	50 to 200	50 to 200	50 to 200

MAIN SPINDLE:

Diameter in front bearing	mm	120	120	150	150
Back	mm	40	40	50	50
Taper	mm	Metric 70	Metric 70	Metric 70	Metric 70
Taper of rotating sleeve	mm	No. 5 Morse	No. 5 Morse	No. 5 Morse	No. 5 Morse
Speeds: number		32	32	32	32
range	rpm	0.8 to 1250	0.8 to 1400	0.8 to 1400	0.8 to 1400
Speed in reverse	rpm	1.25	1.25	1.25	1.25

STANDARD FEEDS:

Number of longitudinal and cross feeds	mm per rev.	0.1 to 2.5	0.1 to 2.5	0.1 to 2.5	0.1 to 2.5
Range of longitudinal feeds	mm per rev.	0.15	0.15	0.15	0.15
Cross feeds	mm per rev.	0.15	0.15	0.15	0.15

FINE PRECISION FEED:

with use of lead screw and equipment supplied to special order	mm per rev.	0.01 to 0.005	0.01 to 0.005	0.01 to 0.005	0.01 to 0.005
Number of fine feeds	mm per rev.	13	13	13	13
Range	mm per rev.	0.01 to 0.005	0.01 to 0.005	0.01 to 0.005	0.01 to 0.005

THREADS:

Metric:	number	110	110	110	110
Whitworth:	number	0.2 to 120	0.2 to 120	0.2 to 120	0.2 to 120
Module:	number	1.1 to 120	1.1 to 120	1.1 to 120	1.1 to 120
Diametral Pitch:	number	0.125 to 30	0.125 to 30	0.125 to 30	0.125 to 30
Threader Pitch:	number	17	17	17	17
threads per 1" dia.	number	17	17	17	17
pitch	mm	1.278 to 3.34	1.278 to 3.34	1.278 to 3.34	1.278 to 3.34

LEAD SCREW:

Diameter	mm	20	20	20	20
Pitch	mm	12	12	12	12

TAILSTOCK:

Diameter of tailstock above	mm	120	120	120	120
Live center or, on special request, dead center taper	mm	No. 5 Morse	No. 5 Morse	No. 5 Morse	No. 5 Morse
angle of point	mm	60°	60°	60°	60°
movement of tailstock above	mm	250	250	250	250

TURNING OF TAPERS:

Maximum length of taper	mm	700	700	700	700
Maximum angle (in either direction)	mm	10°	10°	10°	10°

COPYING FROM TEMPLATE:

Maximum length of template	mm	700	700	700	700
Maximum depth	mm	100	100	100	100
Diameter of roller	mm	50	50	50	50

ELECTRIC MOTOR:

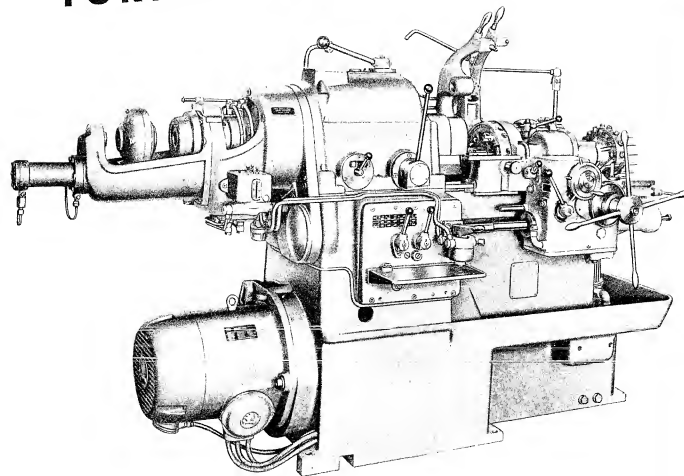
Power	kW	8.15	8.15	8.15	8.15
Speed	rpm	3200x1300	3200x1300	3200x1300	3200x1300
Floor space required by machine at minimum turning length	m ²	200x1300	200x1300	200x1300	200x1300
Weight of machine at minimum turning length with standard equipment but without electric motor and electrical equipment	kg	3500	3500	3500	3500
Increase in weight per every additional 500 mm (19 1/2") turning length	kg	210	210	210	210
Weight of 1 supporting leg	kg	70	70	70	70

PLEASE SPECIFY IN YOUR ORDER THE MAINS VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS

The machines are continuously being improved upon. The particulars given in this prospectus are therefore not binding in detail

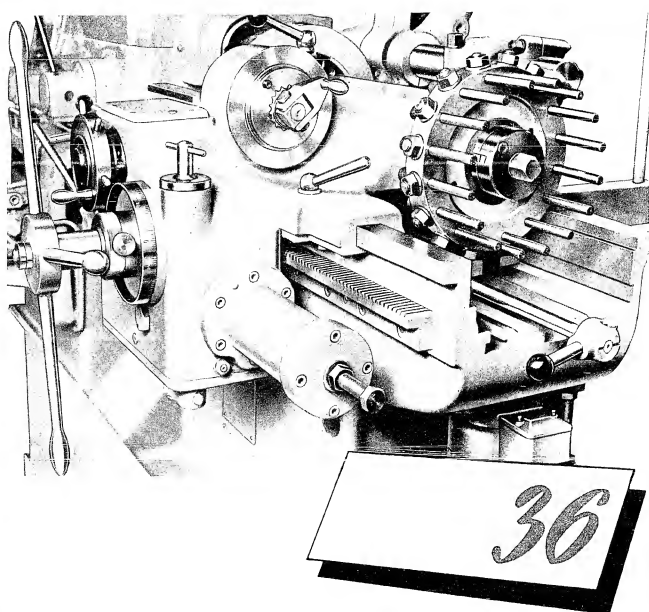
STROJEXPORT

TURRET LATHE



RN TYPE

 **ŠKODA**



The Type RN 36 Turret Lathe is intended for the economical machining of steel as well as of alloys of non-ferrous and light metals. In its design particular attention was devoted to the requirement of fully utilizing cemented carbide tipped tools. The simple operation of this machine contributes to the reduction of non-productive times. Thus, for instance, bar stock is fed and chucked pneumatically. The machine works permanently with a high degree of accuracy and reliability.

Characteristic Features and Advantages of the Type RN 36 Turret Lathe

Drive by reversible three-speed electric motor controlled by a single switch lever on the headstock; the same lever is also used for applying the main spindle brake. Wide overall range of spindle speeds divided into five ranges any one of which may easily and quickly be obtained by means of change gears supplied with the normal equipment of each machine. High speeds of headstock spindle make it possible to use economically the most up-to-date cutting tools and, as a result, to reduce the

costs of machining while the output is increased at the same time. Even at the highest spindle speeds the machine works accurately, all its rapidly rotating parts being carefully balanced. Wide range (1 to 22.5) of individual groups of speeds permits, on the one hand, high cutting speeds for working with carbide tipped tools, on the other hand low cutting speeds e. g. for reaming or thread chasing by means of tool or high-speed steel. Fine gradation of each speed range, the 10 different speeds of which are obtained by a total of four pairs of gears.

Only two pairs of gears are in mesh for every spindle speed so that the machine runs smoothly and heating of the headstock is reduced to a minimum.

The headstock spindle is of extraordinary rigidity and runs without play in pre-loaded roller and ball bearings so that there are no vibrations; thus one of the main conditions for the accurate working of the machine is satisfied.

There are no clutches in the headstock (either for starting or stopping the machine or for changing speeds). As a rule such clutches generate heat and thus adversely affect the mechanism of the headstock.

Headstock is provided with large bearings outside the guideways of the bed so that the forces acting on the headstock spindle are transmitted to the bed without any distortions.

Main spindle brake located outside the headstock so that its efficient cooling is ensured; therefore the heat generated by braking causes no heating of the headstock mechanism.

Good suction of oil.

The oil pump is submerged and placed so low that, should any leakage develop later, it cannot affect the adequate supply of lubricating oil.

Lubrication of headstock by ordinary engine oil which is also used for all other assemblies of the machine so that only this single grade of lubricant is required for the entire machine.

Accurate disengagement (within 0.02 mm) of the longitudinal power feed in the direction of the headstock either by means of adjustable stop pins of the stop drum on the turret slide, or by a drum length stop which is supplied as special equipment of the machine and fixed on the front side of the bed, or by means of a simple folding stop. Before the final disengagement of the feed the turret slide is pressed, during a few revolutions of the headstock spindle, by a force which, to a certain extent, is adjustable, against the stop so that, once the automatic feed is disengaged, it is no longer necessary to finish turning to an accurate length by the hand feed, continuously watching the indicator.

Accurate disengagement (within 0.02 mm) of the cross power feed of the turret slide forward and backward by means of adjustable cross stops, three of which are supplied as standard equipment with each machine; this accurate disengagement makes it possible to strictly maintain the closest limits.

Simple cross feed drive which is obtained from the longitudinal feed in the shortest way simplifies the operation of the mechanism and reduces the oil consumption.

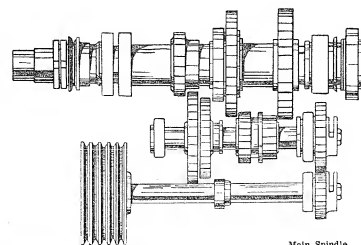
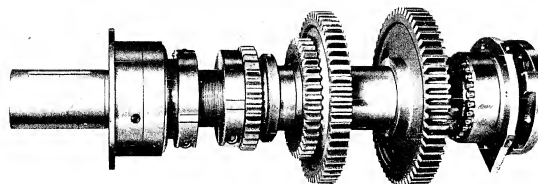
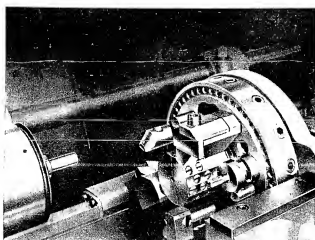


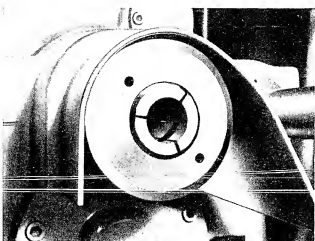
Diagram of Headstock Spindle Drive

Main Spindle





Support of Tool Holders by End of Turret Head Shaft



Chucking Head for Bar Stock

operator, and the tool may be set easily and accurately and very fine tolerances may be kept on the work. Small weight of machine (1300 kg or 2870 lbs) together with its high output, high speed, rigidity, and reliability in service is the result of the smaller external dimensions and the suitable arrangement of the mechanism within the machine.

Numerous standard equipment of each machine, includes, in addition to a complete electric and wet turning attachment, also a pneumatic clamping cylinder with a hand distributor and all other fittings arranged for connection to the pneumatic piping on the one hand, and to the pneumatic chucking head or chuck or the pneumatic feed, which are available as special equipment on the other hand.

A rich choice of special equipment which can easily be fitted, even later, and which considerably widens the working range and output of the turret lathes.

The pneumatic chucking head for bar stock contains hardened and ground three-part jaws which are closed pneumatically. The compressed air is admitted into the pneumatic clamping cylinder screwed to the rear end of the main spindle by operating the hand lever of the air distributor. The pressure produced in the cylinder is transmitted to the chucking head through the connecting tube. The jaws suitable for bar stock (accurately drawn or rolled only, but straightened) with a round, square or hexagonal cross section permit clamping of stock up to 1 mm bigger or smaller than the rated bore. The jaws are easy to replace when the nut union is unscrewed. Normally (unless specified otherwise in the order) jaws for a diameter of 34 mm are supplied with the chucking head.

The chucking head is perfectly balanced and about 30 per cent shorter than conventional hand-operated collect bar chucks so that it is free from vibrations even with the heaviest chips and highest speeds. The chucking head can easily be detached from the main spindle and dismantled for cleaning purposes within a few minutes.

The Type VB 1 Pneumatic Chucking Head for Blanks

serves for chucking workpieces already parted off or blanks which have already been machined at the end where they are to be chucked and which shall only be machined at the other end. In order to chuck the work in the direction of its axis always exactly in the same position the work rests either on the internal stop adjustable in advance and supplied with the chucking head, or, in the case of work provided with a collar,

Simple but reliable protection of the longitudinal and cross feed mechanism against overload by means of the above described automatic disengagement of the longitudinal and cross feeds which cannot fail, as opposed to the usually employed protective clutches the reliability of which depends on correct adjustment and attendance.

Simple engagement and disengagement of cross feed by a simple downward movement of the crank without any further movement.

Protruding front end of turret head shaft designed to support the tool holders, in order to prevent them from vibrating, when turning with cemented carbide tipped tools, even with the heaviest chips.

Oil-tight feed box and apron. The parts of the feed mechanism contained therein are abundantly lubricated either automatically or by means of a hand pump so that there are only few points requiring separate additional lubrication. This simplifies the attendance, reduces the oil consumption as well as the wear of the parts, and prolongs the precision of the machine.

Arrangement of all feeds in geometric progression according to the proposal of ISA.

Easy setting of tool to turning diameter required by means of micrometer cross feed stops (to be ordered according to our tool catalogue) and a hand wheel for the fine turret head cross feed. The hand wheel is provided with a sliding clutch. The force by which the micrometer cross feed stop or the tool are pressed when the hand wheel is being turned does not therefore depend on the judgement or skill of the

operator. The latter is not supplied with the chucking head. The gripping power developed by the pneumatic clamping cylinder pulls, by means of a connecting tube, the chucking collect of the chucking head and thus closes the jaws within the collet. These jaws permit the chucking of work the dimensions of which differ by as much as 0.3 mm from the rated bore of the jaws; they can easily be changed by unscrewing the collet in which they are inserted. The biggest bore of the jaw is 38 mm. The three part jaws supplied with the chucking head (one per chucking head) are — unless otherwise specified in the order — only rough drilled to 10 mm and not hardened. Further jaws of this kind may be furnished to order; they must be finished to the required diameter of work on the machine on which they are to work.

The Type Vc 1 Pneumatic Three Jaw Chuck

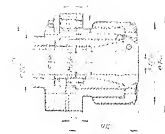
is normally supplied with a set of hardened gripping jaws which are easily interchangeable and reversible so that the work can be gripped by the same jaws either from inside or from outside. A set (1×3) of unhardened jaws can be supplied to order. Hardened jaws are suitable for chucking work with a rough surface, while unhardened jaws are used for accurate chucking of finely finished work. Although these three jaw chucks are especially suited for accurate concentric chucking of parted off pieces, castings, and pressed parts they may also be used for chucking bar stock which may be of great advantage when changing from blanks to bar work. Work with a difference in diameter of less than 8 mm can be chucked without adjusting the jaws, for larger diameters adjustment is necessary; however, it is easy to make by loosening the screws provided in the jaws. The gripping force developed, in this case also, by the pneumatic clamping cylinder mounted at the rear of the main spindle is transmitted to the jaws by means of a connecting tube and a system of levers and can be adjusted by an air pressure control valve which can be furnished as special equipment.

The Type Vd 1 Pneumatic two Jaw Chuck

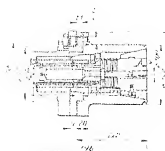
serves mainly for gripping angular and irregular work, e.g. fittings. It is provided with interchangeable unhardened gripping jaws which must eventually be adapted to the chucked work. The interchangeable gripping jaws rest upon basic jaws which have a sufficiently large stroke and on which they can be accurately adjusted. Otherwise the two jaw chuck resembles the three jaw chuck as described above.

The Type Ve 1 Air Pressure Control Valve

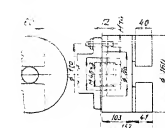
with pressure-gauge is fitted on the outside of the machine so that it is within easy reach of the operator. This valve serves for setting the chucking force according to the size and the thickness of the walls of the chucked work, so that it will be chucked firmly but without distortion. There is, with pneumatic chucking as opposed to hand chuck-



Type Va 1 Pneumatic Chucking Head for Bar Stock



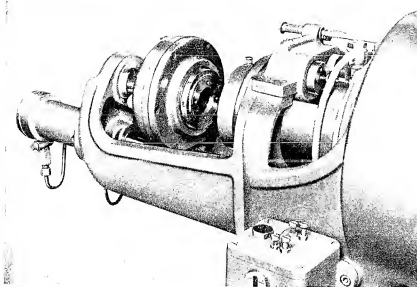
Type Vb 1 Pneumatic Chucking Head for Blanks



Type Vd 1 Two Jaw Pneumatic Chucking Head

Diagram of Pneumatic Machine Equipment





Type Vt 1 Pneumatic Bar Feed

ing, no later relaxation of the gripping force because the gripping power continues even during the turning work.

The Type Vf 1 Pneumatic Bar Feed

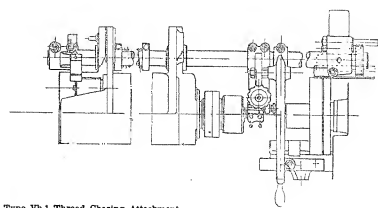
is fitted to the turret lathe at the rear of the pneumatic clamping cylinder; it is controlled by the same hand lever of the air distributor as the chucking heads or chucks. When this lever is moved to its middle position the gripping jaws of the chuck are released, the bar is gripped by the feeding jaws and moved forward by the length required. The feed operates fast and, as it is independent on the main spindle

speed, it works reliably even at the highest speeds of the machine. When the hand lever of the distributor is moved to its extreme position the gripping jaws of the chucking head or chuck grasp the bar and the released feeding jaws return to their original position. The feeding jaws permit feeding of bars the diameter of which differs as much as ± 1 mm from the rated bore of the feeding jaws; they are easily interchangeable and leave no traces of gripping on smooth drawn bars. The bars can be used up completely, i. e. without unused short pieces. Normally (unless specified otherwise in the order) jaws with a bore of 34 mm are supplied with the feeding attachment.

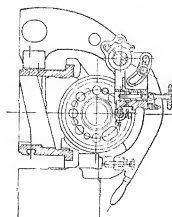
(Other cross sections of feeding jaws are listed in the tool catalogue). In addition, the following parts are furnished with the feeding attachment: three interchangeable sockets for guiding the feed bars within the main spindle (only one of which is inserted at any time according to the diameter of the bar being machined). Guiding of the stock in a noiseless tube has to be separately specified in the order.

The Type Vg 1 Compressor

for providing the compressed air necessary for chucking and feeding can be supplied, when ordered, together with the turret lathe. A turret lathe equipped with this compressor forms a completely independent unit and is especially suited for plants where there is either no compressed air at all or air of a low pressure (about 6 atm. or 85 psi are required). The compressor is driven by its own electric motor forming a part of and supplied with the compressor set, same as the fan, the necessary valves and switches. The consumption of compressed air for one of the chucking heads or chucks and for the bar feed is approximately 1 cu. metre (35 cu. ft.) per hour at a pressure of 6 atm. (85 psi) and a temperature of 20° C (68° F) [i. e. 6 cu. metres (210 cu. ft.) per hour] of air at normal atmospheric pressure. This consumption figure is based on 60 clamping and feeding operations per hour.

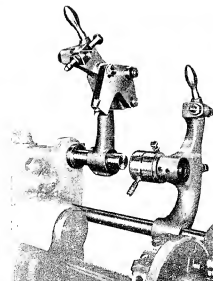


Type Vh 1 Thread Chasing Attachment

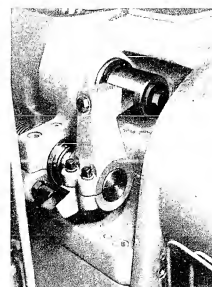


The Type Vh 1 Thread Chasing Attachment

serves for cutting male as well as female threads, both right hand and left hand. It is also suitable for cutting fine (low pitch) threads. A different leader with the corresponding follower has to be used for every pitch. As a rule (unless specified otherwise in the order) a leader and follower for a pitch of 1 mm is supplied with the attachment. Thread leaders and followers for other pitches are listed in the tool catalogue according to which they may be ordered. As the drive of the attachment has a ratio of 1 to 2 the pitch of the lead must be twice as great as the pitch of the thread to be cut on the work piece. When the end of the thread is reached the follower can be automatically disengaged by means of adjustable stops and the attachment returned to its original position. The thread chasing attachment is rigid enough to be used for cutting with carbide tipped tools (even in very hard material) both male and female threads, but the latter only if the diameter of the hole is greater than 30 mm.



Thread Leader and Follower of Thread Chasing Attachment



Type Vh 1 Thread Chasing Attachment

The Type Vi 1 Automatic Moving Steady

for thread chasing is useful for cutting threads with cemented carbide tipped tools. Its advantages are the following:

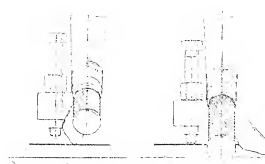
- 1) Elimination of the strain of the operator who previously had to follow the tool moving through the thread in order to catch the arm in time to stop it from dropping back.
- 2) Reliable movement out of the thread which is automatic as well as automatic movement of the arm into the working position.
- 3) Economy resulting from a longer life of tools and saving of time.
- 4) Easy fitting-fitted to the arm in place of the standard handle.

It is recommended to order the automatic moving steady as a supplement to the type Vh 1 thread chasing attachment. The appropriate tool holder may be ordered according to the tool catalogue.

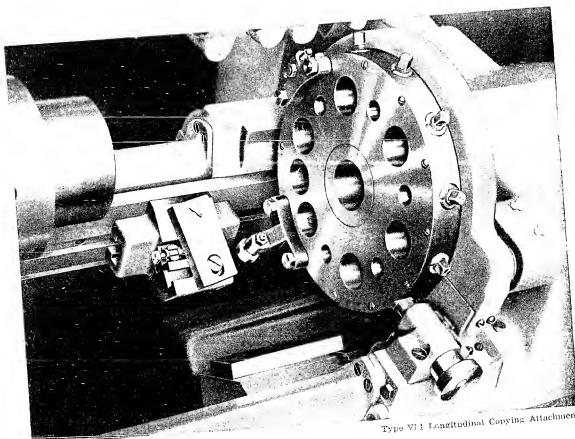
The Arm for Type Vj 1 Die Heads

is attached to the guide shaft of the thread chasing attachment in place of the tipping arm with the thread chasing slide which must first be removed. It is therefore recommended to order the arm for the die heads as a supplement of the thread chasing attachment. The die heads (which open automatically when the cut is completed) serve for cutting accurately concentric male threads and are clamped to the arm either directly or by means of suitable reducing sleeves, depending on their size. Work with the thread chasing attachment as well as with this arm can be done quite independently of the turret slide.

In case the customer does not possess a type Vh 1 thread chasing attachment the type Vk 1 arm has to be ordered.

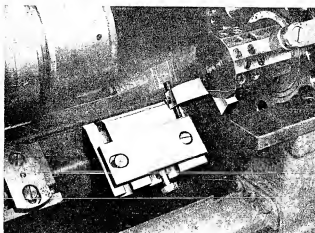


Type Vi 1 Automatic Moving Steady for Thread Chasing

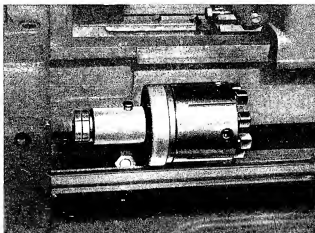


Type VI 1 Longitudinal Copying Attachment

Type Vm 1 Transverse Copying Attachment



Type Vn 1 Drum Length Stop



The Type VI 1 Longitudinal Copying Attachment

consists of a bracket adjustable on the inside rear surface of the bed, and carrying a hardened guide ruler the angle of which is adjustable according to the taper to be turned. The turret head is guided along the set guide bar by a copying pin clamped in a holder attached to the face of the turret head. The guide bar is straight (form bars are only furnished at an extra charge) and 125 mm ($4\frac{9}{16}$ "") long. The maximum taper for which the guide bar can still be set is 15° either way.

The Type Vm 1 Transverse Copying Attachment

is intended for turning the face of the work-piece. It is built and attached in a similar manner as the longitudinal copying attachment. However, instead of the copying pin a copying roller is fitted in the holder on the face of the turret head. The guide bar is straight (a curved bar is only supplied at an extra charge) and can be set for angles up to 20° either way. It is 75 mm ($2\frac{9}{16}$ "") long.

The Type Vn 1 Drum Length Stop

is bolted to the front wall of the bed and serves for limiting or disengaging the longitudinal power feed of the turret slide. It is provided with eight finely adjustable stop screws which can be set for

different lengths so that they limit the longitudinal movement of the turret head at different distances corresponding to the individual operations.

The Type Vo 1 Longitudinal Folding Stop

is fitted in a similar position as the drum length stop but has only one stop screw limiting or disengaging the longitudinal feed of the turret slide. If not used the stop need not be removed but can merely be folded away so that the turret slide with the apron may pass it.

The Turret Head, Type Vp 1 with Holder, Type Vr 1 without Holder

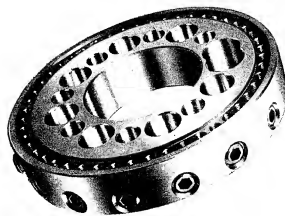
is only provided with precision drilled tool holes if it is supplied together with the turret lathe with which it is to be used. If it is furnished later, its tool holes are only rough drilled and are only finished to accurate dimensions after the turret head has been mounted on the machine where it is to work permanently. In such a case a drawing is sent with the turret head containing all necessary dimensions for finishing the tool holes, as well as directions for fitting and removing the turret head.

Cross Stops

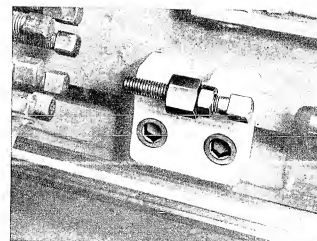
for limiting or disengaging the cross feed of the turret head have to be ordered according to the tool catalogue. The following are supplied as standard equipment of the turret lathe: 1 symmetrical, 1 right-hand and 1 left-hand cross stop. In addition micrometer cross stops are available to special order. These stops are provided with a micrometer screw and permit the tool to be set accurately for the required turning diameter and the closest limits to be easily maintained. This eliminates, in many cases, subsequent grinding of the workpiece. Micrometer right and left-hand cross stops are available, either lateral or symmetrical.

Lighting of Machine

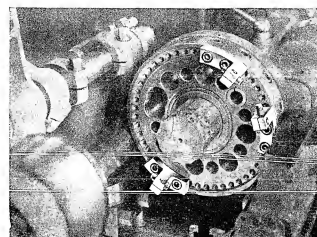
A spot light with joints provided with a switch is fitted to the rear wall of the machine. It can be adjusted to any position found to be most favourable for the work. For reasons of safety a voltage of 24 Volts is used for lighting. This voltage is obtained from the standard mains voltage by means of a transformer fitted in the contactor box (separate from the machine) where the contactors and the main switch are centralized. The contactor box is connected to the terminal board fitted on the rear part of the machine.



Turret Head



Type Vo 1 Longitudinal Folding Stop



Cross Stops on Turret Head

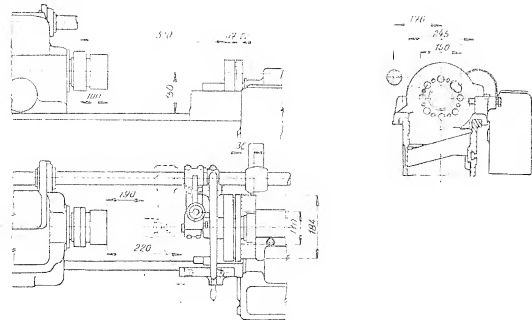


Examples of Products of the Type RN 36 Machine

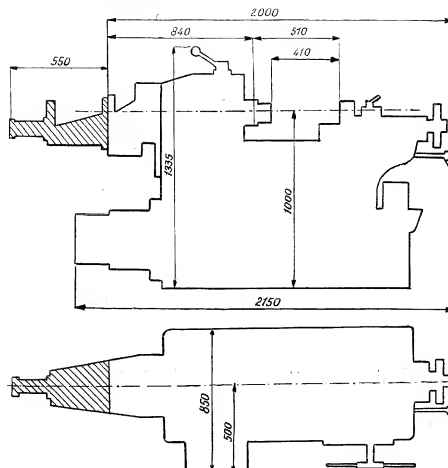
36



Working space between headstock and turret slide (with thread chasing attachment)



Dimensional Drawing of Machine



SPECIFICATION

Chucking Range:

Maximum chucking diameter:		
for bar stock	mm	34
for blanks in a chuck (for work with a smaller number of tools)	mm	110 to 180
Diameter of chuck (Vc 1 or Vc 2)	mm	160
Maximum swing over bed:		
with thread chasing attachment	mm	250
without thread chasing attachment	mm	360
Maximum distance:		
turret head to main spindle flange	mm	510
turret head to chuck for the bar stock	mm	410

Turret Head:

Diameter of pitch circle of tool holes	mm	150
Number of tool holes		16
Number × diameter of tool holes	mm	7 × 20
(double hole)	mm	7 × 30
Maximum longitudinal travel of turret slide	mm	(2 × 35)
		410

Speeds:

Number of speeds (forward and reverse)		50
Speed ranges (set by change gears supplied as standard equipment of machine):		
No. I range (with 10 steps)	r. p. m.	56 to 1250
No. II range (with 10 steps)	r. p. m.	71 to 1600
No. III range (with 10 steps)	r. p. m.	90 to 2000
No. IV range (with 10 steps)	r. p. m.	120 to 2500
No. V range (with 10 steps)	r. p. m.	140 to 3150

Feeds:

Number of longitudinal and cross feeds		6
Range of longitudinal feeds	mm per rev.	0.056 to 0.56
	inches per rev.	0.0022" to 0.022"
Range of cross feeds	mm per rev.	0.028 to 0.28
	inches per rev.	0.0011" to 0.011"

Main Three Speed Electric Motor:

Permissible number of reversals (at 670 or 680 r. p. m.)	per hour	120
Speed	r. p. m.	680 to 2800
Maximum output at full utilization of machine	kW	9

Dimensions and Weights:

Floor space (without stock feed attachment)	mm	2250 × 950
Length of machine with stock feed attachment and stands for guiding bar stock	mm	5550
Height of centre-line of spindle above floor	mm	1000
Weight of machine with standard equipment	kg	1300

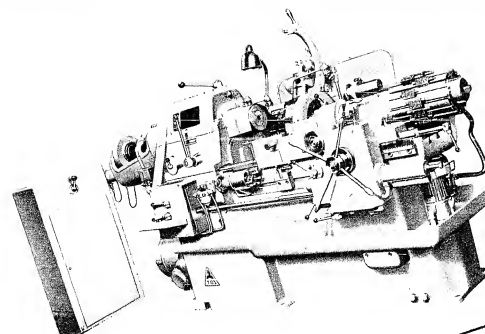
Standard Equipment included in the price of the machine:

Electric equipment of machine with main electric motor, coolant pump motor, centrifugal pump with piping and two nozzles, pneumatic clamping cylinder with hand controlled air distributor, change gears, 3 stops for cross feed, 3 sheet metal shields, set of spanners for attendance, grease gun, instructions for operation and setting, precision test certificate.

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS

The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.

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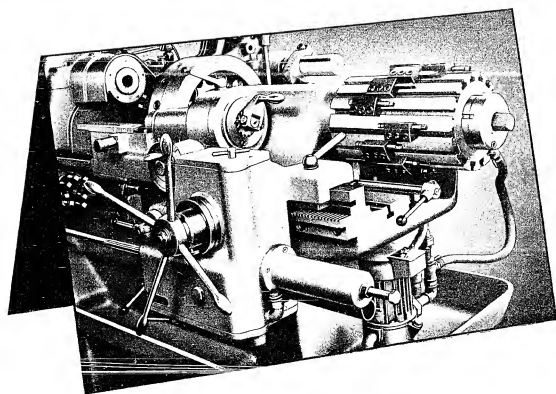


TURRET LATHE

60

TYPE

The machine is intended for the economical machining of steel as well as of alloys of non-ferrous and light metals. In its design particular attention was devoted to the requirement of fully utilizing cemented carbide tipped tools. The simple operation of this machine contributes to the reduction of non-productive times. Thus, for instance, bar stock is fed and chucked pneumatically. The machine works permanently with a high degree of accuracy and reliability.



DESCRIPTION

Drive by reversible three-speed electric motor controlled by a single lever on the headstock; the same lever is also used for applying the main spindle brake.

Wide overall range of spindle speeds; divided into five ranges any one of which may easily and quickly be obtained by means of change gears supplied with the normal equipment of each machine. High speeds of main spindle make it possible to use economically the most up-to-date cutting tools and, as a result, to reduce the costs of machining while the output is increased at the same time. Even at the highest spindle speeds the machine works accurately, all its rapidly rotating parts being carefully balanced. Wide range (1 to 22.5) of individual groups of speeds permits, on the one hand, high cutting speeds for working with carbide tipped tools, on the other hand low cutting speeds e. g. for reaming or screwcutting by means of tool or high-speed steel.

Fine gradation of each speed range the 10 different speeds of which are obtained by a total of four pairs of gears.

Only two pairs of gears are in mesh for every spindle speed so that the machine runs smoothly and heating of the headstock is reduced to a minimum.

The main spindle is of extraordinary rigidity and runs without play in pre-loaded roller and ball bearings so that there are no vibrations; thus one of the main conditions for the accurate working of the machine is satisfied.

There are no clutches in the headstock (either for starting or stopping the machine or for changing speeds). As a rule such clutches generate heat and thus adversely affect the mechanism of the headstock.

Headstock is provided with large bearings outside the guideways of the bed so that the forces acting on the main spindle are transmitted to the bed without any distortions.

Main spindle brake is located outside the headstock so that its efficient cooling is ensured; therefore the heat generated by braking causes no heating of the headstock mechanism.

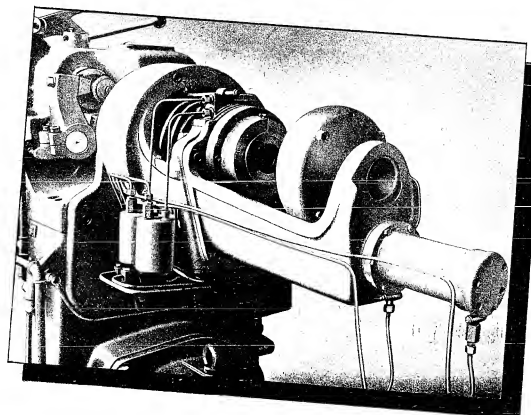
The oil pump is submerged and placed so low that, should any leakage develop later, it cannot affect the adequate supply of lubricating oil. Lubrication of headstock by ordinary engine oil which is also used for all other assemblies of the machine so that only this single grade of lubricant is required for the entire machine.

Accurate disengagement (within 0.02 mm) of the longitudinal power feed in the direction of the headstock either by means of adjustable stop pins of the stop drum on the turret slide, or by a drum stop which is supplied as special equipment of the machine and fixed on the front side of the bed, or by means of a simple folding stop. Before the final disengagement of the feed the turret slide is pressed, during a few revolutions of the headstock spindle, by a force which, to a certain extent is adjustable, against the stop so that, once the automatic feed is disengaged, it is no longer necessary to finish turning to an accurate length by the hand feed, continuously watching the indicator.

Accurate disengagement (within 0.02 mm) of the cross power feed of the turret head forward and backward by means of adjustable cross stops, three of which are supplied as standard equipment with each machine; this accurate disengagement makes it possible to strictly maintain the closest limits.

Simple cross feed drive, which is obtained from the longitudinal feed is the shortest way, simplifies the operation of the mechanism and reduces the oil consumption.

Simple but reliable protection of the longitudinal and cross feed mechanism against overload by means of the above described automatic disengagement of the longitudinal and cross feeds which cannot fail, as opposed to the usually employed protective clutches the reliability of which depends on correct adjustment and attendance.



Simple engagement and disengagement of cross feed by a simple crank without any further movement.

Protruding front end of turret head shaft designed to support the tool from vibrating, when turning with cemented carbide tipped tools.

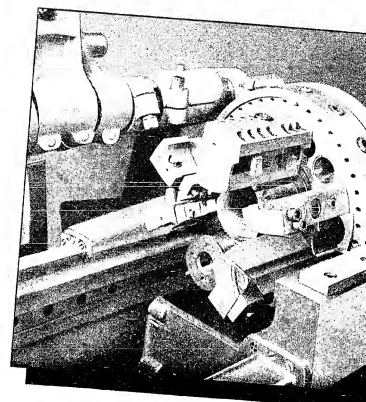
Oil-tight feed box and apron. The parts of the feed mechanism are only lubricated either automatically or by means of a hand pump, points requiring separate additional lubrication. This simplifies consumption as well as the wear of the parts and prolongs the life of the machine.

Arrangement of all feeds in geometric progression according to the standard.

Easy setting of tool to turning diameter required by means of a simple lever (which can be ordered according to our tool catalogue) and a hand wheel. The hand wheel is provided with a sliding clutch. The turret feed stop or the tool are pressed when the hand wheel is turned. The setting is independent on the judgement or skill of the operator, and the tool is set to the required diameter and very fine tolerances may be kept on the work. Low weight and compact design together with its high output, high speed, rigidity, and reliability make it the smaller external dimensions and the suitable arrangement of the turret.

Rich standard equipment of each machine includes, in addition to the above mentioned, cooling equipment, also a pneumatic clamping cylinder with a fitting arranged for connection, on the one hand, to the pneumatic chucking head or chuck or the pneumatic tool holder.

Rich choice of special equipment which can easily be fitted, even without the working range and output of the turret lathe.

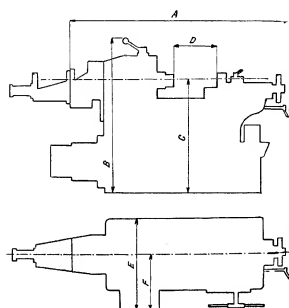


STANDARD EQUIPMENT (included in price of machine)

Electrical equipment of machine with main electric motor, coolant pump motor, centrifugal pump with piping and two nozzles, pneumatic clamping cylinder with hand-controlled air distributor, change gears, 3 stops for cross feed, 3 sheet metal shields, set of spanners for attendance, grease gun, operating instructions.

SPECIAL EQUIPMENT (supplied for machine at extra charge)

chucking head for bar stock	arm for type A die head (if customer possesses attachment Vh)
chucking head for blanks	arm for type B die head (if customer does not possess attachment Vh)
pneumatic three-jaw chuck	longitudinal copying attachment
pneumatic two-jaw chuck	transverse copying attachment
control valve with pressure gauge	longitudinal drum-type stop
stock feed attachment	folding stop
compressor set — alternatively Vg 2	turret head with holder
screwcutting attachment	turret head without holder
automatic moving steady	stock guide attachment



Dimensional drawing

	mm	ins.
A	3400	133"
B	1445	57"
C	1085	42 1/2"
D	610	24"
E	1010	39 1/4"
F	610	24"

SPECIFICATION:

Maximum chucking diameter:	mm	58	2 1/4"
for bar stock	mm	170 to 290	6 1/2" to 11 1/2"
for blanks in a chuck	mm	250	9 7/8"
*) for work with a smaller number of tools	mm	310	12 1/4"
Diameter of chuck (III or IV)	mm	550	21 3/4"
Maximum swing over bed:	mm	760	30"
with screwcutting attachment	mm	610	24"
without screwcutting attachment	mm		
Maximum distance:	mm		
turret head to main spindle flange	mm		
turret head to chuck for bar stock	mm		
Diameter of pitch circle of tool holes	mm	230	9 1/8"
number of tool holes	mm	16	
Number X diameter of tool holes	mm	7 X 30	7 X 1 1/8"
*) double hole	mm	7 X 45	7 X 1 3/8"
Maximum longitudinal travel of turret slide	mm	2 X 50	2 X 1 3/8"
Number of speeds (forward and reverse)		70	
Speed ranges (set by change gears supplied as standard equipment of machine):			
No. I range (with 10 steps)	r.p.m.	18 to 400	
No. II range (with 10 steps)	r.p.m.	22 to 500	
No. III range (with 10 steps)	r.p.m.	28 to 630	
No. IV range (with 10 steps)	r.p.m.	35 to 800	
No. V range (with 10 steps)	r.p.m.	45 to 1000	
No. VI range (with 10 steps)	r.p.m.	56 to 1250	
No. VII range (with 10 steps)	r.p.m.	71 to 1600	
Number of longitudinal and cross feeds		9	
Range of longitudinal feeds	mm per rev.	0.056 to 0.90	
	inches per rev.	0.0022" to 0.036"	
	mm per rev.	0.028 to 0.45	
	inches per rev.	0.0011" to 0.018"	

CAPACITY:**TURRET HEAD:****SPEEDS:****FEEDS:****MAIN THREE-SPEED ELECTRIC MOTOR:**

Permissible number of reversals (at 670 or 680 r.p.m.)	per hour	120 (at a uniform rate)
Speed	r.p.m.	680 to 2800
Maximum power at full utilization of machine	kW	15.7

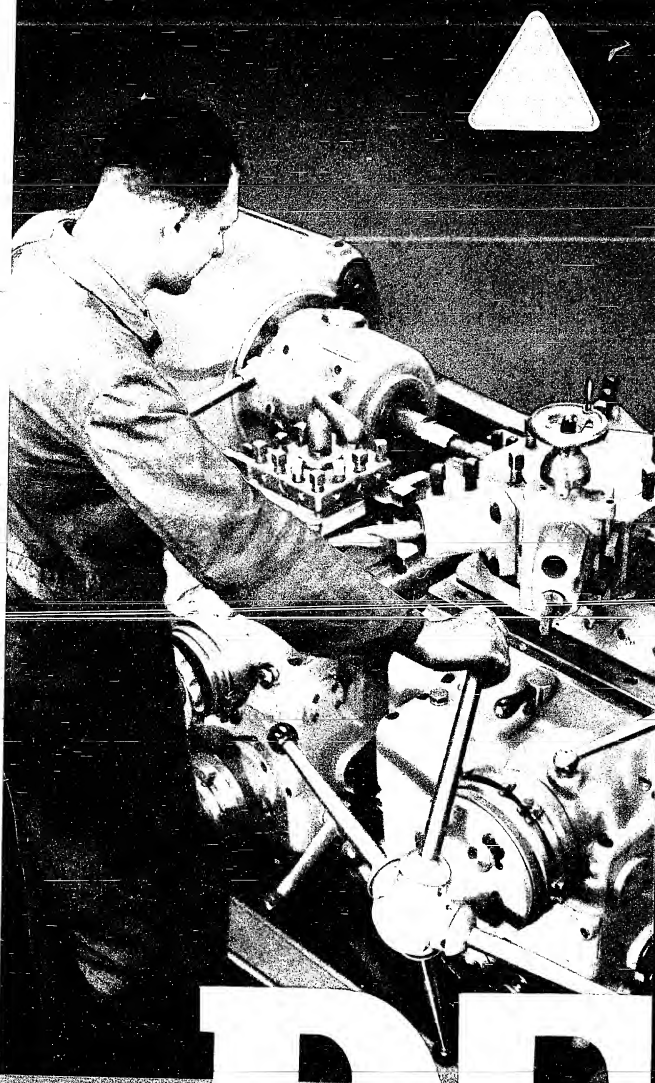
DIMENSIONS AND WEIGHTS:

Floor space (without stock feed attachment)	mm	3435 X 1150	11'4" X 3'10"
Length of machine with stock feed attachment and stands for guiding of bar stock	mm	6480	21'3"
Height of centre-line of spindle above floor	mm	1085	3'7"
Weight of machine with standard equipment	kg	2600	5730 lbs
Weight of railway packing	kg	230	485 lbs
Weight of seaworthy packing	kg	450	990 lbs
Dimensions of seaworthy packing	mm	3420 X 1240 X 1660	11'3" X 4'1" X 5'6"

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS!

The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.

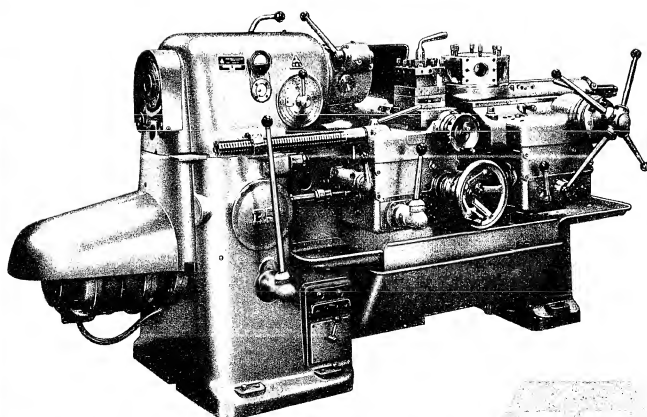
STROJEXPORT — PRAHA — CZECHOSLOVAKIA



TOS CAPSTAN LATHE

Type

R5



THE TOS CAPSTAN LATHE, TYPE

is a universal machine which meets all the requirements of an up-to-date machine tool designed to fully utilize high power cutting tools. Its design was based on the results of the most recent machining research, on experiences of designers and technicians engaged in production and on constant co-operation with the customers. If provided with the appropriate equipment it can be used to advantage both for bar and chuck work.

OUTSTANDING FEATURES: A large number and wide range of speeds and feeds arranged in fine steps enables tools made of high speed steels and cutting alloys to be economically used for cutting the widest variety of materials.

Preselection of speeds and feeds considerably simplifies operation and cuts down idle, unproductive times. Sequence of movements of joystick type control lever for engaging the longitudinal and cross slide feed. Automatic disengaging at feeds of the slides as well as of the turret head by positive stops. Square tool post with automatic movement when control lever is released. Exceptionally easy maintenance and cleaning of turret head. Turret head controlled by star wheel for hand feed. Simple, convenient and rapid operation cuts down production times. Number of controls reduced to minimum.

DESCRIPTION

THE HEADSTOCK is a separate, totally enclosed rigid box. In order to obtain a constant low temperature of the headstock and thereby to ensure a permanent working accuracy of the machine the gear box is located in the left leg of the machine and completely separate from the headstock proper. This arrangement places the spindle as far as possible from sources of harmful vibrations and heat, the centre of gravity of the machine is low, so that the operation of the machine is quiet and noiseless even at the highest spindle speeds.

THE SPINDLE has a very heavy cross section and is made of alloy steel, cemented, hardened and accurately ground. It is very rigid and its critical speeds are above the maximum operating speeds. Its front end runs in an adjustable double-row roller bearing, its rear end in two specially accurate radial bearings which take up the thrust. The play which appears in the spindle bearing after a long period of operation can easily be eliminated. At its front end the spindle is provided with a flange and a taper for fitting a self-centering or a quick action collet chuck.

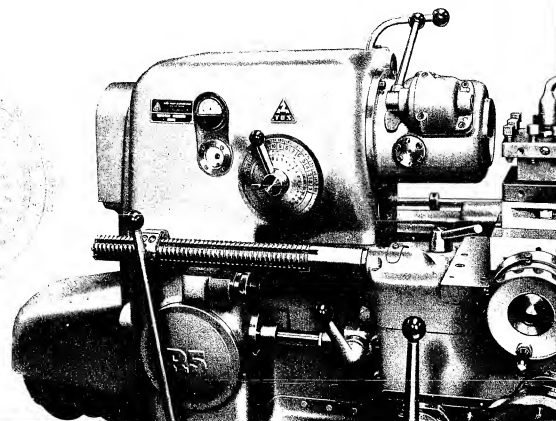
PRESELECTION OF SPINDLE SPEEDS. The high capacity of the machine and the use of cemented carbide tipped tools has reduced machining times. In order to reduce unproductive times the problem of changing spindle speeds was solved by preselection. The speed for the next operation may be preselected while cutting by simply turning the preselection knob on the headstock. The speed indicator has altogether 4 scales. The fixed dial carries the scale of spindle speeds in r. p. m., the scale of spindle speed numbers and the scale of cutting speeds in metres per minute. The rotary dial carries the scale of machined diameters in millimetres. For a given selected speed and machined diameter the cutting speed in metres per minute can be read at a glance on the appropriate scale. On request the indicator may be supplied with diameters in inches and cutting speeds in feet per minute. The preselection can also be used inversely, when the machined diameter and the cutting speed are known. These two figures are set on the scales opposite each other which preselects the corresponding spindle speed. The spindle speed change proper is done by means of the lever arranged on the gear box. This lever also controls the two-directional multi-plate clutch and brake. The preselected spindle speed is changed by moving the lever out of its neutral position away from the machine. The following 18 speeds are available:

28-35.5-45 56-71-90-112-140-180-224-280-355-450-560-710-900-1120-1400 r. p. m.

OPERATION CHARTS. The desired speeds are only selected by the scales when the machine is being set up. During operation it is easier to remember only the speed and feed numbers and not to burden one's memory with the figures. For repetition work or for a larger batch of machined parts it is recommended to use tables known as operation charts. These tables are supplied with the machine together with a transparent case. They have to be filled in when the machine is first set up and filled for possible future use when the job is completed. The tables are filled in according to symbols by inserting speed and feed numbers. The operator only reads or memorizes simple numbers instead of involved r. p. m. and feed figures with several digits.

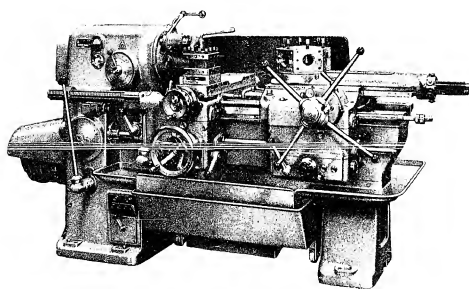


Close up view of headstock with preselection of speeds



THE DRIVE. The 11.56 HP flange mounted driving motor is arranged on the outside of the left leg. The rotor of the electric motor is accurately dynamically balanced and its shaft is directly coupled with the shaft of the two-directional multi-plate clutch. The motor is protected by a cover.

THE GEAR BOX. The gear box drive is controlled by the two-directional multi-plate clutch and an efficient multi-plate brake. The high-speed gears of the gear box made of alloy steel are hardened and ground, the tooth flanks of the sliding gears are rounded off. In the course of the manufacturing process the gears are subjected to several inspections carried out by means of the most modern measuring instruments. All the gear box shafts are running in anti-friction bearings.

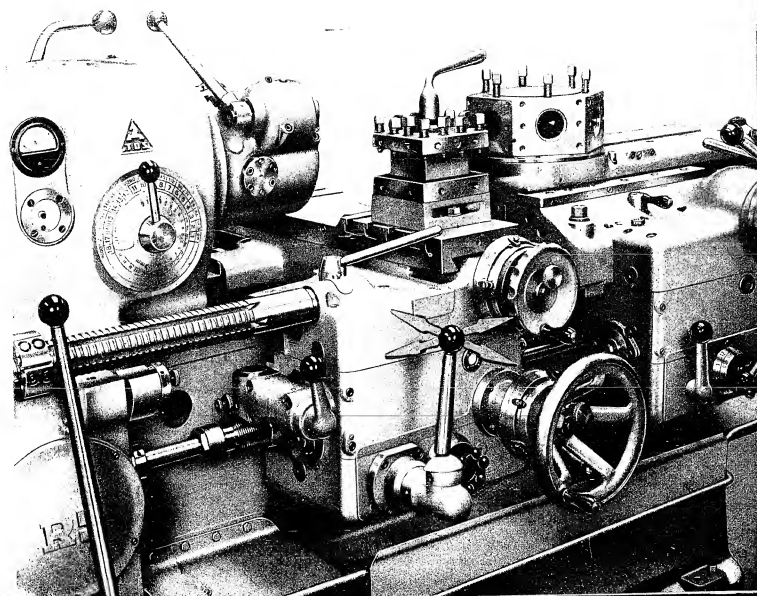


THE BED forms, together with the left and right legs, a single rigid structural unit having a wide cross section. The side walls are stiffened by diagonal U-shaped ribs so that the bed forms a rigid beam and a sturdy base for the machine, resisting all distorting influences and forces. The strong side walls prevent sagging, the reinforcing ribs twisting. The wide guideways are precision ground and their hardness of more than 200 Brinell carefully checked. The front and rear guideways between the headstock and the saddle are protected by covers against abrasion and corrosion by chips and coolant respectively. The guideway covers between the saddle and the turret slide are attached to the saddle and pass through openings cast in the turret slide bed. This ensures an enduring accuracy of the guideways. Fine dust and chips are removed from the guideways by steel wipers.

FEEDS. The feed drive is taken off the spindle through gears and is arranged in the front part of the gear box. The saddle apron is of simple design and the mechanism is readily accessible for inspection when the front cover is removed. The front side of the saddle apron carries the hand wheel for longitudinal feed, the preselection disc and the joystick type lever for engaging the feeds. The hand wheel is provided with a large dial for easy reading of feeds.

ENGAGEMENT OF FEEDS. The longitudinal and cross power feeds are engaged by a single joystick type lever. Its movement in four directions corresponds to the direction of the feed engaged. During any operation the rate of feed can be preselected and on completion of the operation the preselected feed engaged by depressing the lever at the right hand side of the saddle apron. Not only the preselection but also the engagement of the feed may be done while the machining is running. The following twelve rates of longitudinal feed are available:

0.045-0.06-0.09-0.125-0.18-0.25-0.35-0.50-0.71-1-1.4-2 mm per revolution of spindle.



THE SADDLE. The bridge type saddle resting on the wide bed is capable of carrying heavy loads without undesirable distortions, which enables the capacity of the machine and cutting tool to be fully utilized. In cases when only the turret head is used for machining, the saddle may be moved away under the spindle.

THE SADDLE SLIDE has bearing surfaces accurately scraped to fit the ground guideways of the bed on which it can be locked by means of a lever. The saddle slide carries the guideway for the cross slide.

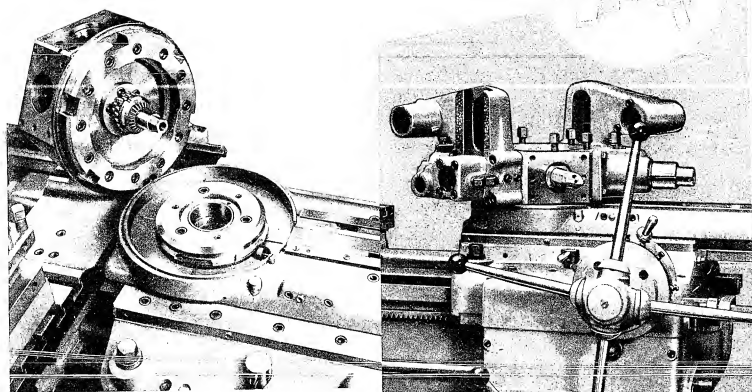
THE CROSS SLIDE can be moved rapidly by hand, the rate of travel being 10 mm (3/8") per revolution of the hand wheel. Apart from the hand travel it is provided with 12 power feeds which can be disengaged by stops in either direction. A large dial with easily readable figures arranged near the cross slide crank permits precision turning to a given diameter. Any undesirable play of the nut of the cross slide screw can easily be taken up by means of a well accessible worm gear. The power feeds of the cross slide are identical with the longitudinal power feeds. Easily movable numbered indicators may be used to advantage for moving the slide by hand in the course of quantity production. The longitudinal and power feeds can be limited by a system of 6 longitudinal and 4 transverse stops. The position of the stops is easily adjustable on shafts with a square thread and they are provided with contact pieces which fold back, which makes the stops universal in their application. The automatic disengagement by means of positive stops operates both in the longitudinal and transverse direction with an accuracy of 0.02 mm (0.0008").

THE FOUR-WAY TOOL BLOCK and rear tool holder with heavy bolts permits even big tools with special shapes to be clamped firmly.

THE TURRET CARRIAGE APRON is of a design similar to that of the saddle apron and has also 12 power feeds ranging from 0.045 to 2 mm (0.002" to 0.08") per revolution of spindle and the feeds can be pre-selected by means of a star wheel and engaged independently of the feeds of the saddle apron even while the machine is running.

THE TURRET CARRIAGE is of rigid design reinforced with ribs. The bed of the turret head can be secured to the machine bed by two clamps. It may be moved along the machine bed by means of a hand wheel together with the saddle slide to which it can be coupled by means of a draw-rod. The turret slide can be secured to the guideways by a screw.

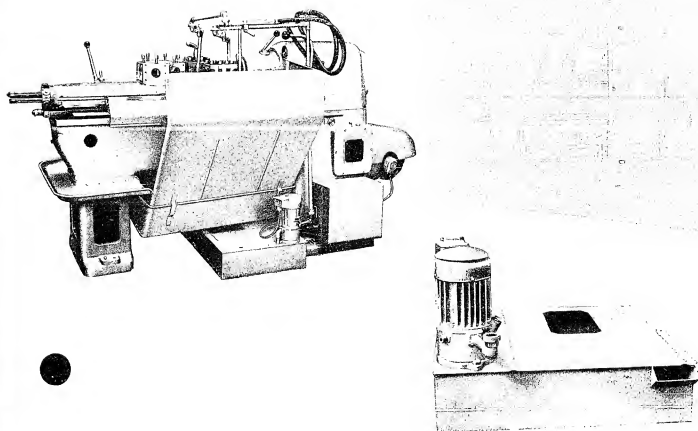
THE HEXAGON TURRET HEAD is centered on an adjustable double-row roller bearing. The turret head is locked and stiffened automatically at the beginning of the forward stroke of the slide. The unlocking, releasing and indexing of the turret head occurs, also automatically, at the end of the return stroke. The locking of the turret head by a strong hardened and ground bolt engaging with an indexing disc of very large diameter ensures a high and permanent accuracy. The movement of the turret carriage is limited by positive stops against which it is moved by means of a hand wheel and star wheel (by using an indicator) with an accuracy of ± 0.02 mm or by the power feed with an accuracy of 0.1 mm (0.0039"). A special universal joint spanner is supplied for quick setting of the stop screws. The safety clutches of the longitudinal and cross feeds in the saddle and turret carriage aprons permit the following forces to be developed in the feeds: longitudinally 1200 to 1500 kg (2640 to 3300 lbs), transversely 800 to 1100 kg (1760 to 2420 lbs). The clutch of the positive stop of the saddle is engaged by moving the feed control lever to its middle position, the clutch of the positive stop of the turret carriage by pressing the arms of the star wheel toward the machine. The automatic rotation of the turret head can be disengaged. When working against positive stops accurate work can be produced by the turret head. The stop screws are easy to adjust. When the securing screw is loosened they can be quickly moved to the approximate desired position. Accurate adjustment is obtained by hand or by means of a cross-handle wrench. The stops rotate simultaneously with the turret.



The control of the turret is centralized in the star wheel for hand travel of the turret carriage. When any arm of the star wheel is moved away from the machine the power feed of the turret head is engaged. When the power feed is disengaged by means of the star wheel, the clutch of the positive stop in the saddle apron is engaged automatically. By turning the star wheel the turret head is withdrawn from or advanced toward the work. The turret head may be equipped for bar or chuck work as required by the customer. Play in the guideways of the turret slides can be taken up by means of tapered gibs and screws.

THE LUBRICATION of the Type R 5 Copston Lathe is designed to require a minimum of attention and checking. The gears and bearings of the headstock, gear box, saddle apron and turret carriage apron have independent oil pumps so that it is only necessary to fill the appropriate oil tanks, keep them filled to the level indicated by the oil level gauge and watch the operation of the pumps in the oil flow indicators. The gear box and headstock are lubricated by a gear pump which delivers the oil into a distributing cup on the headstock from which all moving parts of the transmission mechanism are lubricated by a spray. The oil is delivered through a lamination type filter which stops even the most minute particles of dirt. The saddle apron and turret carriage apron have their own separate piston pumps which distribute the oil to the slides, the guideways of the bed, the worm gear and to the bearings and drives in the gear boxes. The lubrication of the turret head is automatic. All other points are lubricated by a few single or group lubricators for the filling of which a grease gun is supplied with the machine.

COOLING. The cooling system on which depends, in a large measure, the quality of the machined surface and the life of the cutting edge of the tool fulfills all the requirements of a perfect distribution of the coolant. The coolant tank is self-contained and is located on the floor underneath the chip pan, from which it is separated so that it can be cleaned easily. The coolant pump is arranged on the tank. The coolant is distributed through two



pipes one of which is fixed while the other moves with the slide. The joints arranged in the pipe line enable the direction of the flow of the coolant to be adjusted to suit the most varied tools. The used coolant flows back into the tank through the chip pan and through a strainer. The coolant entering into the bore of the spindle also flows back to the tank. Our supply of cooling equipment comprises a rear shield and a chuck guard which prevent splashing of the coolant around the machine. The electrical equipment is designed in accordance with standard specifications for machine tools. The terminal board is located in the switch box behind the front leg and accessible when the cover is removed. The power is supplied to the machine through a main switch which, when opened de-energizes the whole internal electrical equipment. The motors are controlled by push buttons which energize or de-energize air break contactors with thermal overload protection. The main and pump motors are protected against short circuits by fuses. The control circuit is protected by an electric lamp provided with joints a continuous check of the load of the machine. The machine is lighted by an electric lamp provided with joints by means of which it can be adjusted to give the most convenient lighting of the working space. The whole electrical equipment is normally designed and tested in our works for 380 Volts A. C., three phase, four wire, 50 cycles. If required by the customer the machine will be supplied with electrical equipment designed for a different system of electric power. The customer merely has to connect the machine to the mains.

OPERATION OF THE MACHINE. All the controls of the machine are conveniently arranged and their number is reduced to a minimum. The operation of the machine by preselection of speeds and feeds is unique in its simplicity. This also results in considerable savings in time during setting up, and reduction of idle times. The smooth finish of the sliding surfaces of all the moving parts contributes to an easy movement, accuracy and ease of operation. A detailed instruction book with illustrations, a wiring diagram, description, etc. is supplied with each machine. When completed every machine is subject to a test for manufacturing and working accuracy (according to the methods of Professor Dr. G. Schlessinger). The results of these tests are entered in a test chart which is supplied with the machine.

STANDARD EQUIPMENT (supplied without special order and included in the price of the machine):
1 transparent case and 20 operation charts,
18 indicators with figures, set of spanners (2 box spanners, 2 C-spanners, 3 double ended spanners, 1 universal joint spanner),

1 screw driver,
1 grease gun,
1 handle,
1 square turret head,
Stops for carriage and cross slide,
1 rear shield against splashing coolant,
1 operator's instruction booklet.

SPECIAL EQUIPMENT: 220 Volt electric equipment (including lighting) without motors.

7.5 kW (11.5 HP) squirrel cage electric motor.
CRN 3 electric motor driven coolant pump with 0.125 kW (0.17 HP) electric motor, 2800 r. p. m.

Coolant piping with fittings, without electric motor driven coolant pump.
RP 101 Taper turning and copying attachment with follower roller mounted on RP 102 pin and RP 103 copying tracer.

The RP 101 taper turning and copying attachment is designed for working according to a ruler, i. e. for turning tapers up to 300 mm (12") long with angles up to 20°, or according to a template, i. e. for turning shapes also up to 300 mm (12") long and up to 35 mm (1 1/4") deep. Accordingly either the roller is used mounted on the RP 102 pin or the RP 103 copying tracer. The attachment is engaged and disengaged by means of a lever.

RP 111 Screwcutting attachment. Both metric and Whitworth threads can be cut on the type R 5 capstan lathe. The method of operation is fundamentally the same as, but simpler than on a conventional lathe the lead screw and nut of which are replaced by an exchangeable leader and follower. The leader is clamped to the feed shaft and the follower is attached to a fitting at the left hand side of the saddle apron. The follower is brought into or out of engagement with the leader by means of a lever arranged at the left hand side of the saddle apron. The follower cannot be engaged when the power feed is engaged and vice versa. The screwcutting attachment enables threads to be cut close up to a shoulder by using the automatic disengaging mechanism. The pitch of the thread is given by the leader and follower. With one leader and follower threads with only one pitch can be cut.

RP 112 Screwcutting-leaders, RP 113 screwcutting followers. 2 sets of screwcutting leaders and followers are supplied for the cutting of the most common metric and Whitworth threads. Leaders and followers are normally manufactured for cutting threads with the following pitches:

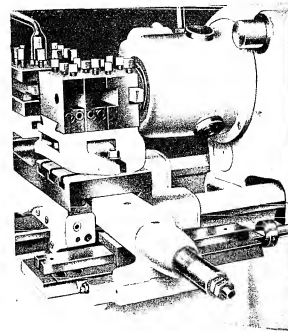
1 1.25 1.5 1.75 2 2.5 3 3.5 4 4.5 5 5.5 6 and 7 mm and Whitworth threads with 19-18-16-14-12-11-10-9-8-7-6-5-4 1/2 and 4 threads per inch.

RP 112 leaders and RP 113 followers are marked with the pitch of the thread they are made to cut. Leaders and followers for cutting left hand threads are supplied to special order. When ordering please specify the quantity, whether for right hand or left hand, metric or Whitworth thread and the pitch or number of threads per inch. Examples of order specifications:

1 RP 112/113.10 R stands for 1 leader and 1 follower for cutting right hand metric threads with a pitch of 10 mm.

2 RP 112.10 WL stands for 2 leaders for cutting left hand Whitworth threads with 10 threads per inch.

1 RP 113.4.5 R stands for 1 follower for cutting right hand metric threads with a pitch of 4.5 mm.



2 RP 113.4 $\frac{1}{2}$ WL stands for 2 followers for cutting left hand Whitworth threads with 4 $\frac{1}{2}$ threads per inch.

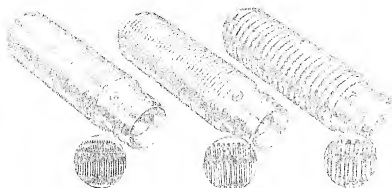
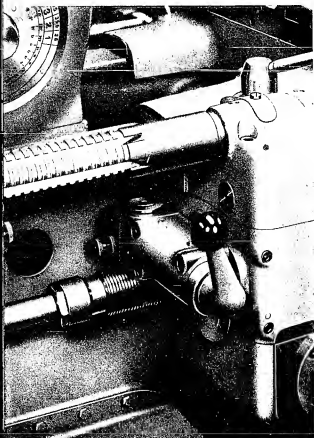
1 RP 112 screwcutting leader and 1 RP 113 follower for cutting right hand metric threads with a pitch of 2 mm are supplied as standard equipment of the attachment. This follower and leader are included in the price of the attachment.

RP 121 automatic stock feed mechanism with safety tube, push bar and feeding head. This is an essential supplementary item for bar work. We supply the machine with this mechanism if required by the customer. The rear feeding head is arranged to swivel in order to facilitate the insertion of the bar stock also from the front of the machine. The feeding head sliding on guide bars is pulled into the spindle with the bar stock either automatically by a weight or by means of a star wheel. When the feeding head reaches its extreme position (near the spindle) it is returned to the initial position by turning the star wheel backward. For the forward movement toward the spindle the screws holding the material are clamped by hand, for the return movement they are released. For bars with a smaller diameter than 24 mm (1") and for more reliable feeding a tube is fixed in the feeding head provided with a pin which presses against the end of the bar during the feeding movement. The bar can be fed through the spindle to the chuck by means of the push bar until it is used up completely. The following items are supplied with the automatic stock feed mechanism: A safety cover of the feed mechanism, a rough finished flange for mounting a 190 or 240 mm (7 $\frac{1}{2}$ " or 9 $\frac{1}{2}$ ") dia self-centering chuck, a RP 132 three- or four-jaw, 190 or 240 mm (7 $\frac{1}{2}$ " or 9 $\frac{1}{2}$ ") dia self-centering chuck and a chuck guard for the prevention of splashing of the coolant.

RP 141 quick-acting collet chuck. This is a further essential supplementary item for bar work. The collets for the chuck are exchanged to suit the shape and diameter of the stock. They are supplied for all standard sizes of only bright drawn round, hexagonal and square stock. The exchange of the collets in the chuck is very simple and quick. The accurate gripping diameter of the chuck can easily be adjusted by means of a nut at the front of the chuck.

Standard Collets

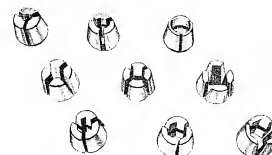
Designation	For stock	mm dia												
RP 142	round	10	12	14	16	18	20	22	25	27	30	35	40	50
RP 143	hexagonal	8	9	11	14	17		22		27	32	36	41	
RP 144	square	10		15			20	25		30	35			



The following collets are supplied for machining inch size stock:

Designation	For stock	in. dia.																
RP 142	round	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{4}$	2
RP 143	hexagonal	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{4}$	
RP 144	square	$\frac{3}{16}$	$\frac{7}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{7}{8}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{4}$	

Other collets for sizes not mentioned above can only be supplied to special order. The collets are made of high grade steel, carefully hardened and precision ground. A single gripping is used for the grinding operation, by which a high precision is achieved and possible distortions caused by hardening are eliminated. Three-split collets are used for round and hexagonal stock, four-split ones for square stock. Please specify the quantity, RP designation and diameter in your order, for instance:

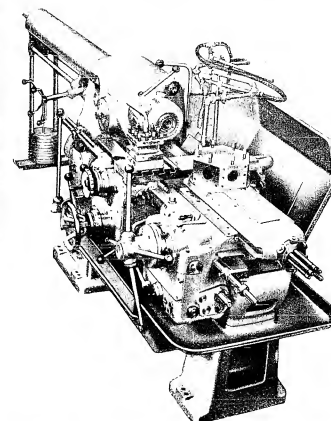
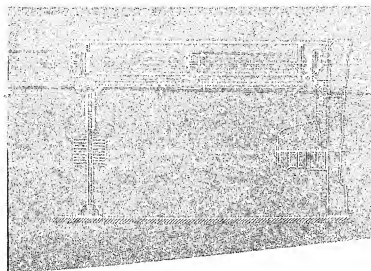


3 RP 142.20 stands for 3 collets for 20 mm dia round stock.

2 RP 143.14 stands for 2 collets for 14 mm hexagonal stock.

One RP 142.50 collet, which is included in the price of the chuck is supplied as standard equipment.

Collets of the older type RS 50 machine can be used with the type R 5 capstan lathe.



For equipment for bar and chuck work and for special equipment for various jobs please refer to the special catalogue:
"Equipment for Type R 5 Capstan Lathe"

S P E C I F I C A T I O N :

MAIN DIMENSIONS:

Height of centres over bed	mm	230	9 1/16"
Maximum turning diameter over covers of bed guideways	mm	510	20 1/16"
Maximum turning diameter over turret slide	mm	450	17 3/4"
Maximum turning diameter over cross slide	mm	255	10"
Maximum distance, spindle nose to turret	mm	750	29 1/2"
Maximum distance, chuck to turret	mm	590	23 1/8"
Diameter of self-centring chuck	mm	190—240	7 1/2"—9 1/2"
Diameter of collet chuck	mm	225	8 7/8"
Width of bed	mm	400	15 3/4"

SPINDLE:

Bore, dia	mm	53	2 1/8"
Maximum size bar stock handled: round	mm	50	2"
Maximum size bar stock handled: hexagonal	mm	41	1 5/8"
Maximum size bar stock handled: square	mm	35	1 3/4"
Spindle taper	Morse	6	5
Flange according to DIN 812, dia	mm	100 175	3.937" 6.889"

SPINDLE SPEEDS:

Speeds in both directions	r. p. m.	18	
Range of speeds		28 ... 1400	
Ratio of geometrical progression		1.26	

SADDLE AND CROSS SLIDE:

Longitudinal travel of saddle	mm	660	26"
Travel of cross slide	mm	250	9 7/8"
Number of power feeds		12	0.002"—0.08"
Range of longitudinal and cross feeds	mm rev.	0.045—2	5/16" X 5 1/8"
Dimensions of four-way tool block	mm	147 X 147	5 3/4" X 5 3/4"
Dimensions of tools for four-way tool block	mm	34 X 25	1 3/8" X 1"

TURRET:

Size of turret across flats	mm	260	10 1/4"
Dimensions of clamping surface	mm	113 X 140	4 1/2" X 5 1/2"
Number of clamping surfaces and holes in turret	mm	6	
Diameter of holes in turret	mm	54	2 1/8"
Turning length	mm	250	9 7/8"
Number of feeds	mm rev.	12	
Range of feeds		0.045 ... 2	0.002 ... 0.08 in. per rev.

TAPER TURNING AND COPYING ATTACHMENT:

Taper turning length	mm	300	11 7/8"
Maximum angle of taper	mm	20	11 7/8"
Length of shape turned according to template	mm	300	11 7/8"
Depth of shape turned according to template	mm	35	1 3/8"

SCREWCUTTING BY THREAD LEADERS:

Number of metric threads	mm	14	
Pitch range of metric threads	mm	1—7	
Number of Whitworth threads		14	
Pitch range of Whitworth threads	threads per inch	4 ... 19	
Length of threaded cut	mm	100	4"
Number of thread leaders for metric threads		14	
Number of thread leaders for Whitworth threads		14	

DRIVE:

Flange mounted electric motor 1430 r. p. m.	kW/HP	7.5/11.5	
Electric motor for coolant pump 2600 r. p. m.	kW/HP	0.125/0.17	
Capacity of coolant pump at 0.3 atm. (4.4 lbs per sq. in.)	lites per min. galls per min.	20 4.4	

DIMENSIONS AND WEIGHTS:

Floor space required	mm	3300 X 1400	118" X 55"
Floor space required by machine with bar feed	mm	4060 X 1400	160" X 55"
Height of lathe	approx. mm	1555	61 1/2"
Net weight with standard equipment and motor	approx. kg	1800	lbs 3960
Weight of electric motor 7.5 kW	approx. kg	85	lbs 187
Weight of electric motor driven coolant pump 0.125 kW	approx. kg	12	lbs 26
Weight of electrical equipment, motors excluded	approx. kg	11	lbs 24
Weight of ordinary packing	approx. kg	300	lbs 660
Weight of seaworthy packing	approx. kg	400	lbs 880

DIMENSIONS OF PACKING:

Length, width and height	approx. m	2.62 X 1.3 X 1.49	8' 7" X 4' 3" X 4' 11"
Volume of packing	approx. m ³	5.1	cu. ft. 180

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

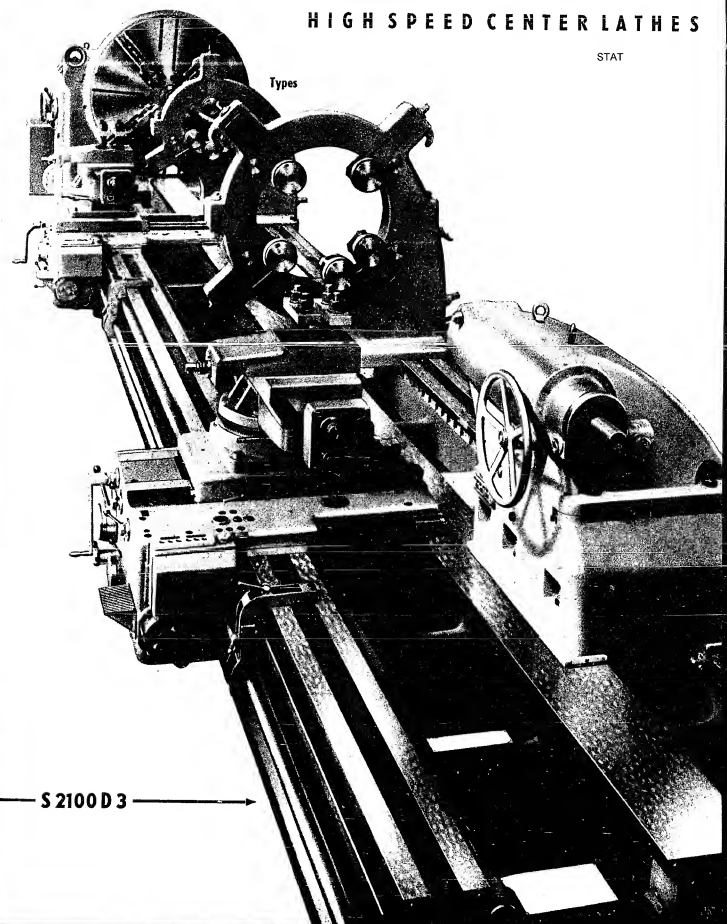
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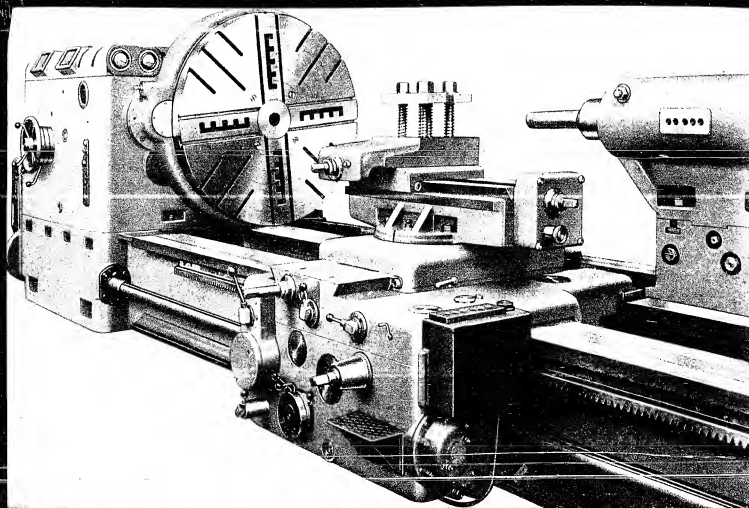
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HIGH SPEED CENTER LATHES

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S 2100 D 3



HIGH SPEED CENTER LATHES

TYPES

are machines intended for very heavy turning work. Both are designed on the same basic lines. They are marked by a high range of spindle speeds and feeds arranged in fine steps and can therefore be used to advantage for work with sintered carbide tipped tools as well as for work with wide tools and tools of special shape made of tool steel or high speed steel.

THEIR OUTSTANDING FEATURES ARE:

- High power main drive motor
- High spindle speeds with a wide range (1:200)
- Large number of feed rates arranged in fine steps
- High rigidity of design
- Easy and quick control of machine from operator's post
- Screwcutting on entire turning length
- High-grade material and workmanship of statically and dynamically stressed parts

DESCRIPTION:

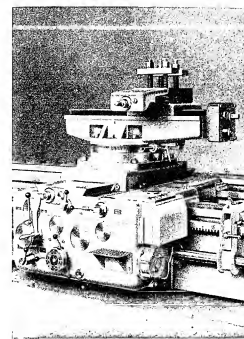
THE DRIVE. The machine is driven by a three-phase squirrel cage motor through a starting clutch set for the shortest starting period, forward and reverse, and equipped with an automatic, adjustable, electromagnetically controlled brake for quick stopping of the drive. The motor is controlled by push-buttons arranged on the headstock and on the individual carriages. The inching of the spindle is controlled by a push-button on the headstock. When it is operated the brake is simultaneously released.

THE BED is wide and reinforced with ribs. It has large passages for the chips which are guided into baskets in a channel under the machine. Due to this arrangement the work on the machine need not be stopped to remove the chips. The bed has 3 flat guideways permitting the carriages to move freely past the steadies and tailstock over their entire length of travel.

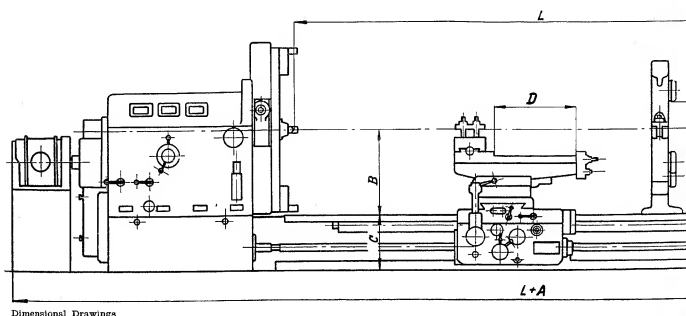
THE HEADSTOCK. The power is transmitted from the electric motor through the starting clutch and sliding gears directly to the sturdy cast steel face plate with a gear rim. The face plate is pressed on to the end of the spindle. The gears are made of special steel and have hardened and, wherever necessary, ground teeth. All layshafts run in anti-friction bearings.

THE SPINDLE. The two radial bearings of the spindle have divided cylindrical bearing shells. The thrust in either direction is taken up by anti-friction bearings. No gears are keyed to the spindle so that its movement is absolutely smooth.

THE CARRIAGES are provided with their own feed boxes and motors for rapid traverse. The longitudinal and cross feeds are engaged by multi-plate clutches which, at the same time, act as safety clutches so that the feeds may be changed at will, even while the tool is in the cut. When the power feed is disengaged, which is done by a single lever, the various movements can immediately be operated by hand.



Carriage of Type S 2100 D3 Lathe



The rapid traverse may be engaged in either direction even while the working feed is engaged. Each carriage can be equipped for screw-cutting on the entire turning length. The carriage is guided on the front guideway and on one half of the centre guideway and clears the steadies as well as the tailstock.

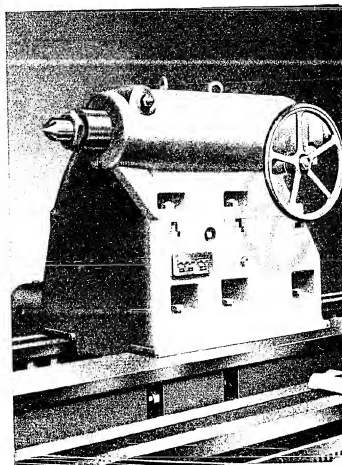
THE TAILSTOCK is provided with a motor for the rapid movement on the bed and a motor for the movement of the tailstock sleeve. The fine movement of the sleeve is operated by hand. The hand and power movement of the tailstock sleeve are mutually independent.

The standard sleeve can be replaced by a sleeve with a live center which is available as special equipment.

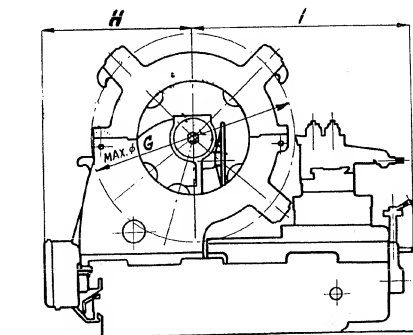
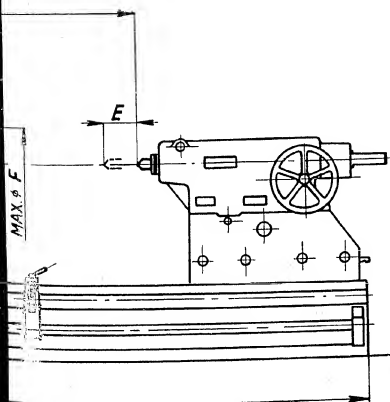
THE STEADIES are of the two-part type, enclosed. The steady for the maximum diameter has five jaws, the one for smaller diameters 4 jaws. The jaws are either fitted with sliding shoes or with rollers. The rollers run in large anti-friction bearings and their surface has a glass-like hardness.

SCREWCUTTING. Metric and Whitworth threads with current pitches can be cut on the machine on the entire turning length. The screwcutting is done by a lead screw with an independent drive. The pitch of the thread is set by means of change gears. For very coarse threads up to a pitch of 400 mm or 16" the machine is provided with a speed raising gear with an 8:1 ratio.

THE TAPER TURNING ATTACHMENT is supplied for the machine as special equipment and permits tapers to be turned on the entire length between centers. The taper is set by means of change gears the ratio of which links the rate of the longitudinal carriage feed with the rate of the longitudinal feed of the swivelled top slide. The top slide is accurately set by means of a template.



Tailstock of Type S 2100 D3 Lathe



	A	B	C	D	E	F	G	H	J
S 1600 D 3	5405	800	680	600	300	800	1200	1215	1850
S 2100 D 3	5700	1050	680	1000	300	1000	1700	1335	1920

LUBRICATION. The headstock and carriage are centrally lubricated. An oil strainer accessible from outside and a lubrication guard with a light signal equipment are fitted into the lubrication circuit of the headstock. When the headstock lubrication does not operate a red light burns and the main motor cannot be started. When the lubrication fails in the course of operation the main motor stops automatically.

CONTROL. The machine is remote-controlled by push-buttons and can be controlled from the headstock as well as from the individual carriages. The clearly laid out hand wheels for the changing of spindle speeds and levers, arranged directly on the individual carriages, for the changing of rates of feed contribute to the easy, convenient and simple operation of the machine.

STANDARD EQUIPMENT

- 1 face plate 1580 mm (5'2") diameter with 4 jaws, pressed on to spindle (for Type S 1600 D3)
- 1 face plate 2000 mm (6'6") diameter with 4 jaws, pressed on to spindle (for Type S 2100 D3)
- 1 fixed steady 800 mm (2'7") diameter (for Type S 1600 D3)
- 1 fixed steady 1000 mm (3'3") diameter (for Type S 2100 D3)
- 2 centers with 90° point and Metric 100 taper
- 1 set of change gears for screwcutting
- 1 gear-type oil pump
- 1 lamination type oil strainer
- 1 set of spanners, cranks, operating plates and tables, operator's instruction booklet

ELECTRICAL EQUIPMENT

- 1 main motor with starting clutch
- 1 motor for rapid traverse of carriage on bed
- 1 motor for rapid movement of tailstock on bed
- 1 motor for rapid movement of tailstock sleeve
- 1 motor for drive of lubricating pump
- 1 contactor box with appropriate contactors and protective equipment
- 1 lubrication guard with signal lights
- 1 ammeter
- 1 tachometer
- push-buttons for remote control of motors on headstock, carriage slide and tailstock
- 1 spot light with plug

SPECIAL EQUIPMENT

Type	S 1600 D3	S 2100 D3
Additional carriage with complete electrical equipment, approx.	kg 4550 (10030 lbs)	kg 5400 (11900 lbs)
A second carriage can be fitted to machines with a length between centers of 8000 mm (26'3") or more		
Additional fixed steady 800 mm (2'7") dia. approx.	kg 1575 (3470 lbs)	
Additional fixed steady 1000 mm (3'3") dia. approx.		kg 2200 (4850 lbs)
Fixed steady 600 mm (1'11") dia. approx.		kg 1350 (2980 lbs)
Attachment for turning tapers on entire turning length (up to maximum length of 7500 mm or (24'7") with change gears for 1:50 and more slender tapers, approx.		kg 10 (22 lbs)
Tailstock sleeve with live center fitted, approx.		kg 365 (805 lbs)

Specification

Type	S 1600 D3	S 2100 D3
WORKING RANGE		
Maximum swing over bed	mm 1600 5'3"	mm 2080 6'9 1/2"
over carriage	mm 1200 3'11"	mm 1700 5'6 1/2"
Height of centers above bed	mm 800 2'7 1/2"	mm 1050 3'5"
Distance, center to center	metres 6, 8, 10, 12	19'8", 26'3", 32'9", 39'4"
Maximum weight of workpiece between centers (without steadies)	kg 28000	61700 lbs
Maximum torque on face plate	cmkg 700000	50000 ft. lbs
HEADSTOCK		
Spindle speeds arranged in 24 steps	r. p. m. 0.71 to 140	0.45 to 90
Taper in front end of spindle	Metric 100	
Diameter of spindle in front bearing	mm 315	12 5/16"
Diameter of face plate	mm 1580 5'2"	mm 2000 6'6"
CARRIAGE		
32 longitudinal feeds arranged in 2 ranges:		
1st range — 16 feeds at all spindle speeds	mm per rev. 0.18 to 5.6	0.007" to 0.112" per rev.
2nd range — 16 feeds at lower spindle speeds	mm per rev. 1.4 to 45	0.056" to 1.8" per rev.
32 cross feeds	mm per rev. 0.07 to 18	0.003" to 0.72" per rev.
Rapid traverse	mm per min. 3000	19 per min.
SCREW CUTTING BY MEANS OF CHANGE GEARS		
Pitch of leadscrew	t. p. l. 2	
35 metric threads, pitch	mm 1 to 50	
35 Whitworth threads	t. p. l. 24 to 1/2	
Steep threads, pitch	8 times normal	
Number of change gears	19	
TAILSTOCK		
Diameter of tailstock sleeve	mm 200	7 7/8"
Taper in tailstock sleeve	Metric 100	
Rapid movement on bed	mm per min. 2000	8'2" per min.
Rapid movement of tailstock sleeve	mm per min. 1420	4'10" per min.
FIXED STEADY		
Maximum clear diameter	mm 800 2'7 1/2"	mm 1000 3'3"
DRIVE		
Main motor:		
output	kW 56	
speed	r. p. m. 960	
Motor for rapid traverse of carriage:		
output	kW 2.5	
speed	r. p. m. 1420	
Motor for rapid movement of tailstock on bed:		
output	kW 1.6	
speed	r. p. m. 1420	
Motor for rapid movement of tailstock sleeve:		
output	kW 0.5	
speed	r. p. m. 2770	
WEIGHTS AND DIMENSIONS		
Weight of machine with one complete carriage and standard equipment:		
for 6000 mm (19'8") between centres, approx.	kg 44500	98100 lbs
for 8000 mm (26'3") between centres, approx.	kg 48500	106900 lbs
for 10000 mm (32'9") between centres, approx.	kg 52500	115800 lbs
for 12000 mm (39'4") between centres, approx.	kg 56500	124600 lbs
Distance, centre to centre, minimum	mm 6000	19'8"
Overall length of machine		
for 6000 mm (19'8") between centres, approx.	mm 11400	37'5"
for 8000 mm (26'3") between centres, approx.	mm 13400	44"
for 10000 mm (32'9") between centres, approx.	mm 15400	50'6"
for 12000 mm (39'4") between centres, approx.	mm 17400	57'3"
for 14000 mm (45'9") between centres, approx.	mm 19400	63'8"

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS!

The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.

STROJEXPORT - PRAHA - CZECHOSLOVAKIA

SPECIFICATION:

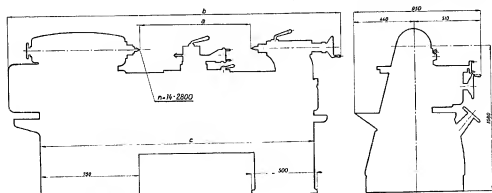
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Swing over bed	mm	380	15"
Dist. between centres (with taper bar)	mm	350	13 3/4"
Swing over carriage	mm	215	8 1/2"
Spindle bore	mm	42	1 1/2"
Taper in spindle	metric No.	50	50
Taper of centres	Morse	3	3
Spindle nose	mm	M 68	M 68
Max. swing with steady rest	mm	100	4"
Max. swing with follow rest	mm	100	4"
Width of bed	mm	360	13 3/4"
Diameter of face plate	mm	320	12 1/2"
Diameter of catch plate	mm	220	8 3/4"
Diameter of jaw-chuck	mm	165	6 1/2"
Section of 4-way tool post:			
□ internal	mm	80	3 1/8"
□ external	mm	125	5"
Maximum section of tool	mm	22	7/8"
Stroke of tailstock centre sleeve	mm	120	4 1/2"
Maximum weight of workpiece	kg	300	660 lbs
Spindle speeds:			
21 rates ranging from	R. p. m.	14—2800	14—2800
Range of longitudinal feeds	mm/rev.	0.02—5.6	cuts per inch 4.5—1270
Range of cross feeds	mm/rev.	0.01—2.8	cuts per inch 9—2540
Pitch of lead screw	t. p. l.	4	0.2—140
Threads: Metric	mm	0.2—140	0.2—140
Whitworth	t. p. l.	1.5—140	1.5—140
Module	mm	0.25—70	0.25—70
Diametral Pitch	DP	1—224	1—224
Speed of main drive motor	R. p. m.	2800	2800
Speed of coolant pump motor	R. p. m.	8	8
Output of main drive motor	HP	0.17	0.17
Output of coolant pump motor	HP	0.17	0.17
For distance between centres	mm	750 1000 1250	30" 40" 50"
Floor space required	mm	950-2520 950-2720 950-3020	37 1/2" x 100" 107" 119"
Weight of machine:			
with standard equipment	kg	1700 1750 1850	lbs 3740 lbs 3850 lbs 4100
with domestic packing	kg	1800 1850 1950	lbs 3960 lbs 4070 lbs 4300
with seaworthy packing	kg	2050 2100 2200	lbs 4500 lbs 4610 lbs 4850
Contents boxed	m ³	4.5 5 5.5	cu. ft. 155 cu. ft. 175 cu. ft. 195

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

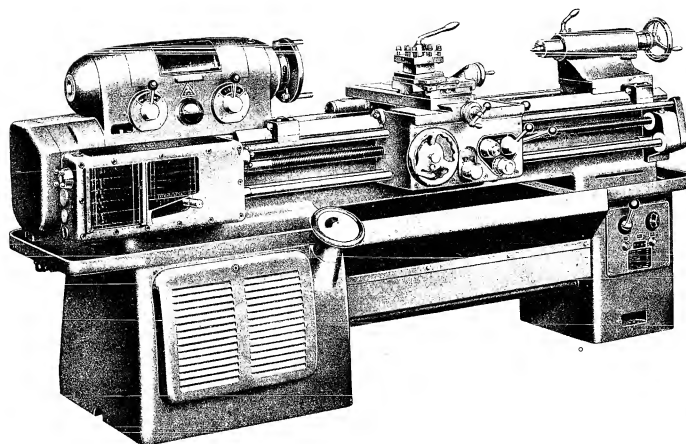
WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY:

a	750	1000	1250
b	2520	2720	3020
c	2100	2300	2600



ZBROJOVKA UNIVERSAL LATHES

SV18_R STAT



are machines which meet all requirements, particularly in jobs where high dimensional accuracy and smooth finish are of prime importance. The wide range of spindle and feed speeds permits economical machining of all classes of material in single part as well as in mass production.

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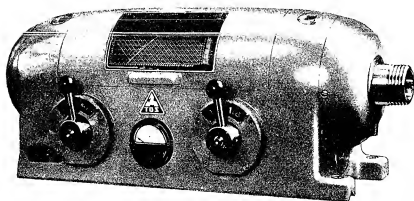


UNIVERSAL LATHES MODEL SV 18 R

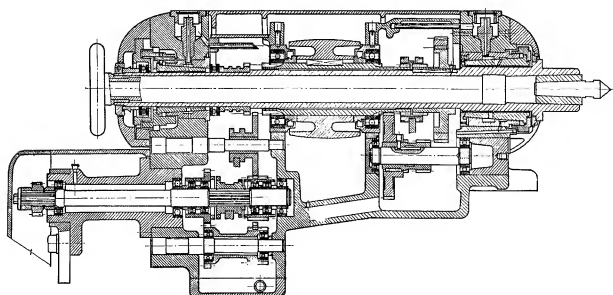
THE SPINDLE is mounted in accurately adjustable plain bearings. The sliding surfaces of the spindle are thoroughly ground and lapped. Thrust in both directions is taken up by axial ball bearings. The lower spindle speeds are derived from a back gear shaft and transmitted through gears. At the higher speeds the back gear shaft is disengaged. The headstock pulley runs on roller bearings which eliminate the bending traction effect of the belt as well as vibrations. Thus an absolutely smooth and quiet running of the spindle is ensured.

THE SPINDLE SPEED RANGE of 14—2800 R. p. M. in 21 rates permits economical machining of all classes of material from light metals to alloy steels of the highest tensile strength. The spindle speed change is effected by a handwheel with the aid of a splined drum for shifting the gears inside the transmission box. For spindle speeds up to 355 R. p. M. the spindle drive is transmitted through a back gear shaft. The 8 HP motor is mounted directly on the gear box. Changing of the spindle rotation and braking of the spindle is accomplished by reversing the motor. Oiling and cooling of the spindle bearings is effected by the circulation system. The oil is supplied by the electric pump located in the left-hand cabinet leg.

THE QUICK CHANGE GEAR BOX embodies all gears for feeds from 0.02 to 5.6 mm per spindle revolution, and for cutting all commonly used metric, Whitworth, module and diametral pitch threads. Threads and feeds are changed by shifting levers according to the values on the operating plate attached to the front of the gear box.



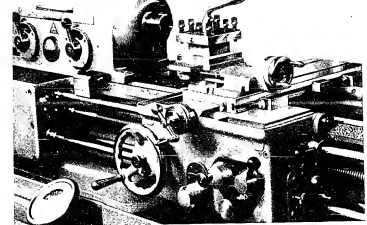
Headstock and spindle mounting



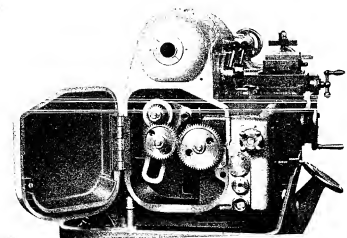
THE APRON BOX is equipped with a clutch for disengaging against positive stop both in longitudinal and cross turning operations. This clutch serves also for protecting the feed mechanism from overload. On the apron box are located the control levers for starting, braking and reversing the motor, for controlling the clasp nut, the longitudinal and cross feed, and the single-tooth clutch which is provided for reversing the direction of feeds and threads. There is also a hand wheel for disengaging the automatic clutch by hand, a wheel for adjusting the releasing power of the automatic clutch and a wheel for the hand longitudinal feed.

SADDLE AND CARRIAGE. The longitudinal slide travels in V-guides. The upper surface of the cross slide is provided with T-slots for clamping fixtures and appliances. The tool slide is fitted with an eccentric attachment for the rapid withdrawal of the tool from the cut in threading.

BED. Chips drop through the gaps between the ribs and are collected in a chip pan. The coolant tank with filters is located underneath the chip pan.

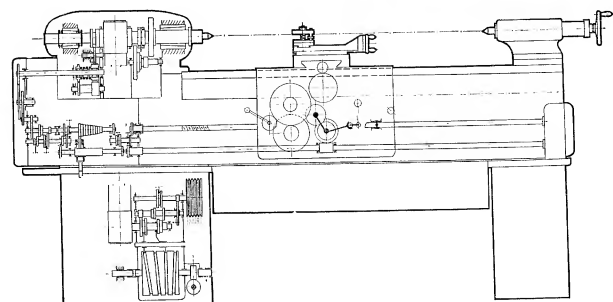


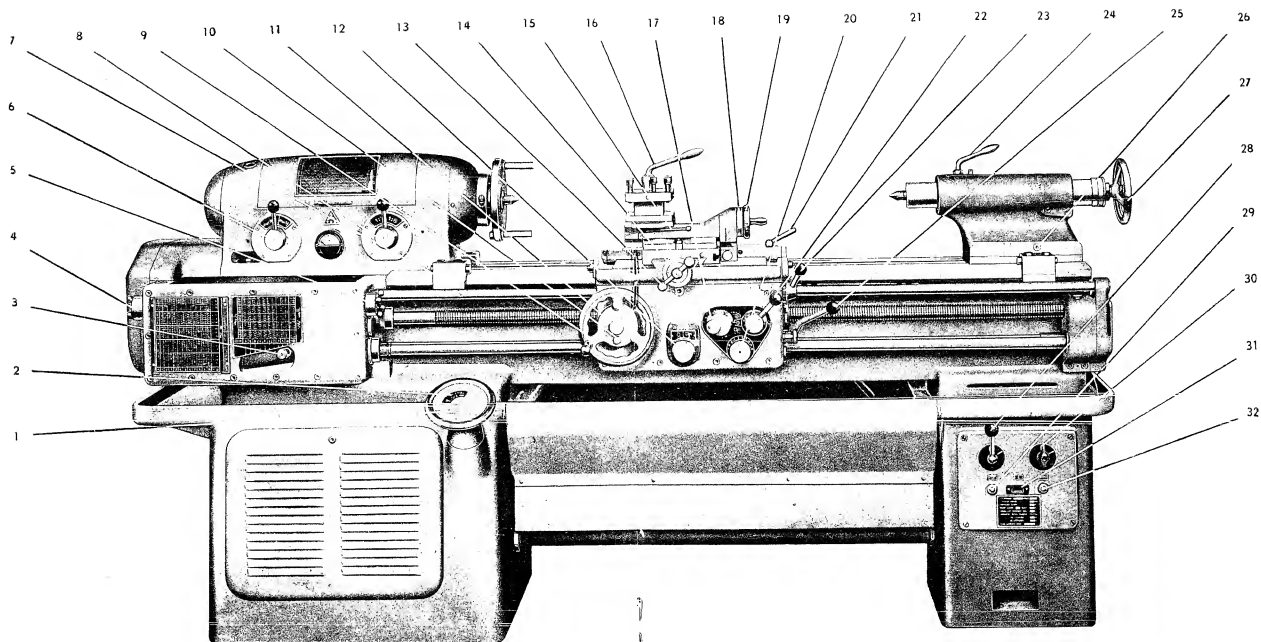
Carriage with apron box



Transmission gears for driving the lead-screw and the draw-bar

Scheme of machine drive





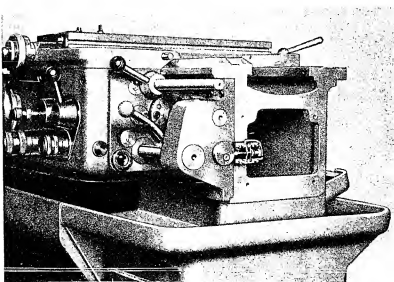
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|---|---|---|--|
| 1. Handwheel for spindle speed change. | 9. Handwheel for longitudinal feed of slide. | 16. Turret control lever. | 25. Lever for starting and braking the main drive motor. |
| 2. Spindle speed scale. | 10. Screw of indexing ring. | 17. Handle for engaging the automatic feeds. | 26. Screws for cross adjustment of tailstock. |
| 3. Lever of quick-change gearbox. | 11. Handle for pulling out the handwheel for manual travel of slide. | 18. Ring with dial. | 27. Handwheel for feeding the tailstock centre sleeve. |
| 4. Handwheel of quick-change gearbox for mesh ratios of 1:1, 1:2, 1:4, 1:8. | 12. Handle for disengaging the automatic clutch by hand. | 19. Handwheel for cross slide feed. | 28. Master switch. |
| 5. Handwheel for changing threads and feeds. | 13. Handle for cross feed. | 20. Handwheel for adjusting the automatic clutch. | 29. Pilot bulb of the master switch. |
| 6. Headstock lever for coarse and standard threads. | 14. Ring with dial. | 21. Locking lever of longitudinal slide. | 30. Coolant pump switch. |
| 7. Stops of longitudinal slide. | 15. Lever of the eccentric for the rapid withdrawal of the tool from the cut. | 22. Control lever of clasp nut. | 31. Spot light switch. |
| 8. Headstock lever for direct drive or for back gears of 1:8. | | 23. Lever for reversing the direction of threads and feeds. | 32. Pilot bulb of the cooling attachment. |
| | | 24. Locking lever of tailstock centre sleeve. | |

U N I V E R S A L L A T H E S M O D E L

SV18R

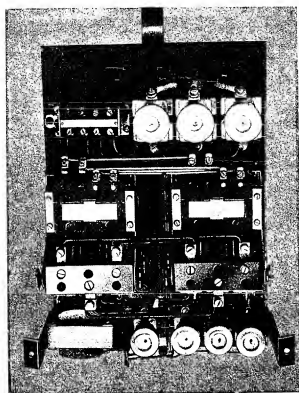
THE TAILSTOCK is cross adjustable for taper turning. The tailstock centre sleeve is hardened and ground and fitted with a scale in millimeters as well as with an indexing ring for very fine adjustment. It may be secured in the required position by tightening a hand lever.

THE COOLING ATTACHMENT consists of a centrifugal electric pump, suction and delivery piping and an oil pan with coolant tank. The inlet piping for the coolant is attached to the carriage so that the coolant flow follows the path of the tool.



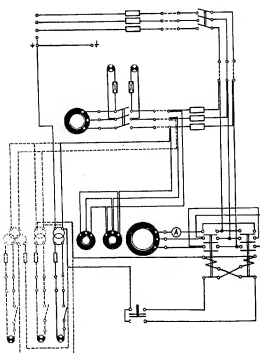
Control switch located in the bed

Electric control panel



ELECTRICAL EQUIPMENT. The machine is fitted with remote pushbutton control of the main drive motor. The current to the control circuit is supplied from a special transformer. The switch for the main drive motor and coolant pump and the switch for the spot light with the signal bulb are mounted on the electric control panel at the front of the right-hand cabinet leg. Inside the cabinet leg are also the air switch, transformer and fuses. Starting and reversing of the motor is accomplished by shifting the lever located on the right-hand side of the apron box. This lever is connected with the switch by a spline shaft.

Wiring diagram

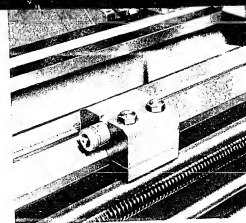
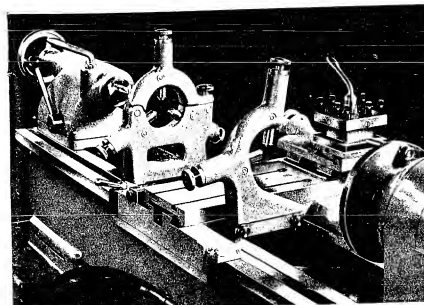


STANDARD EQUIPMENT: Electric motor with electrical equipment and belts, cooling attachment with pump and piping, catch plate, face plate, steady and follow rest, 2 centres to fit Morse taper No 3, reducing sleeve, tool-holder, 2 stops for the longitudinal and 2 stops for the cross feed, back plate for the universal chuck, set of spanners and operating instruction booklet.

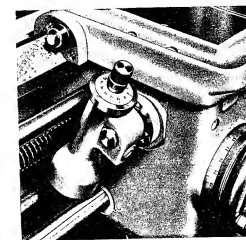
OPTIONAL EQUIPMENT: Universal chuck dia. 165 mm, 4-way toolpost, toolpost with adjustable tool-holders, taper turning attachment, thread indicator, 1 micrometer stop for the longitudinal and 2 for the cross feed, collet chuck attachment, collets in diameters of 2-25 mm, master chuck for the stepped oversize collet chuck for outside clamping with 5 collets dia. 20-64 mm, master chuck for stepped oversize collet chuck for inside clamping with 5 collets dia. 35-80 mm, angle bracket, rear tool-rest, electric spot light.

For Hydraulic Copying Attachment Model KZ 15 see special catalogue.

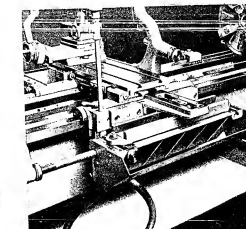
Steady and follow rests



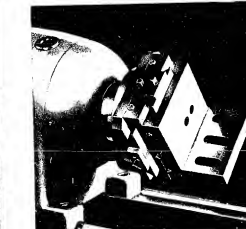
Micrometer stop



Thread indicator



Taper guide bar



Angle bracket

STROJEXPORT

CENTRE LATHE MODEL S28

High Duty Machine for a wide variety of precision work, designed and built to take full advantage of carbide-tipped tools.

An outstanding feature of this machine is the wide spindle speed and feed range.

HEADSTOCK. To increase the rigidity of the machine, the headstock, the gearbox and the quick change gear box are built as one single casting in form of a column to which the bed is flanged.

THE WORK SPINDLE is driven by an electric motor, through the gearbox without a belt transmission. For reversing the spindle rotation a double-acting multiple disc clutch is mounted in the gearbox which also contains all transmission gears. Three different spindle speed ranges are obtained by change gears. The spindle is running in adjustable sleeve bearings. All gears, bearings and the spindle are lubricated by a gear pump located in the lower part of the headstock unit.

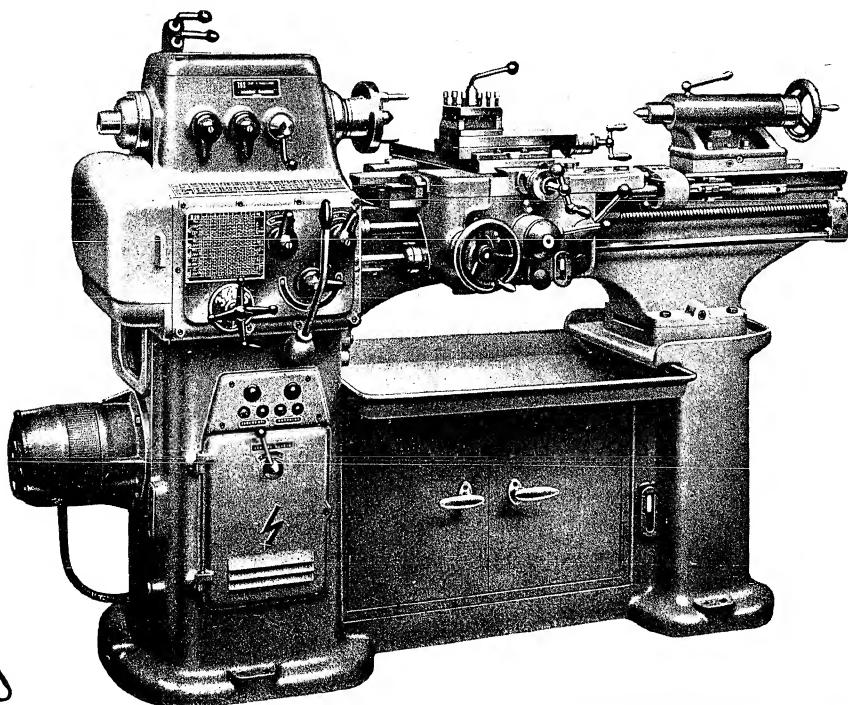
THE QUICK CHANGE GEAR BOX is totally enclosed without the usual opening for the tumbler lever. A wide transmission ratio permits to cut all important metric, Whitworth, module and DP-threads. For each class of threads a single set of change gears is sufficient.

THE APRON is arranged for automatic feed release when operating against the positive stop both in the longitudinal and cross direction. Lubrication by an individual plunger pump is provided.

THE CARRIAGE is fitted with a single lever operated four-way tool block which may be locked in any desired position. The play in the carriage clasp nuts is adjustable to eliminate backlash.

THE BED with the headstock group, rear cabinet leg and base form a rigid frame. Both carriage guideways are flat. The play in the front guide is adjusted by a trapeze gib both in the horizontal and vertical direction. The tailstock guideway is flat at its front and prismatic at the rear. A sheet iron box is fitted beneath the bed for keeping in tools and equipment. The coolant tank is housed inside the right-hand cabinet leg on which an individually-driven coolant pump can be also situated.

STANDARD EQUIPMENT: Electric motor with electrical equipment, catch plate, chip pan, 2 lathe centres, reducing sleeve for the main spindle, 4-way tool block, 2 sets of change gears, set of spanners, positive micrometer stop, built-in sheet iron box for tools and equipment, operating plates, operating instructions.



OPTIONAL EQUIPMENT: Cooling equipment with electric pump and protective contactor, taper turning attachment, rear multiple tool block, universal face plate with 4 hardened jaws, steady rest, follow rest, universal scroll chuck, back plate for scroll chuck, drum length stop, drum cross stop, indicator for adjusting the cross slide, hand-operated collet chuck attachment in the main spindle including 1 collet from 4—22 mm in diameter according to customer's wish, collet chuck attachment which can be operated while cutting including 1 collet according to customer's wish, additional collets, electric spot light without bulb.

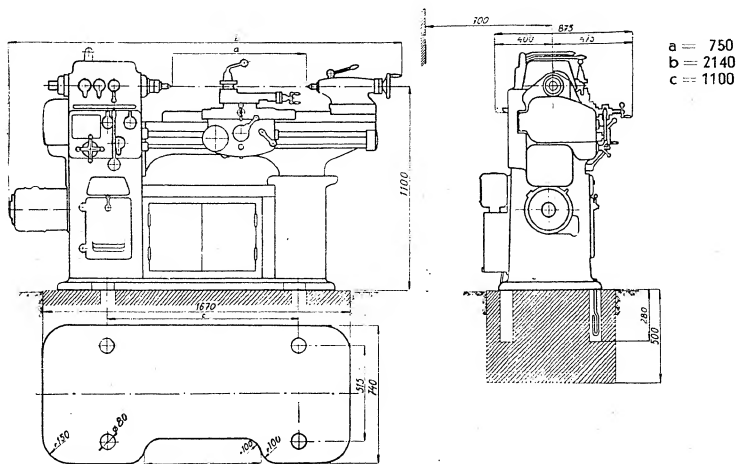
The face plate and the catch plate are fitted with a locking device to prevent their loosening.

SPECIFICATIONS

Swing over bed	mm	280	11"
Distance between centres	mm	750	29 1/2"
Swing over carriage	mm	150	5 7/8"
Width of bed	mm	250	9 7/8"
Diameter of face plate	mm	250	9 7/8"
Bore through spindle	mm	36	1 3/8"
Taper in spindle	metric	N 40	40
Taper of lathe centres	Morse	N 3	3
Spindle nose according to DIN 800	M 68 x 6		M 68 x 6
Spindle speeds: 3 speed bands, 18 speeds each	r. p. m.	20—1000	20—1000
	r. p. m.	31.5—1600	31.5—1600
	r. p. m.	63—3150	63—3150
On special order	mm rev.	0.03—3.52	9—750 t. p. i.
Feeds: 36 longitudinal feeds, ranging from	mm rev.	0.01—1.22	21—2540 t. p. i.
36 cross feeds, ranging from	mm	6	
Pitch of lead screw	mm	0.375—44	
Threads: 36 metric threads, pitch	t. p. i.	0.375—44	8—88
36 module threads, module	r. p. m.		2800
36 Whitworth threads	H. P.		4
Speed of motor	mm	910 2140	33" 85"
Output of motor	kg	1080	2400 lbs
Floor space required (width x length)	kg	1250	2760 lbs
Weight of machine: with standard equipment	kg	1450	3200 lbs
with packing	m ²	4	142 cu. ft.
with overseas packing			
Contents boxed			

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.



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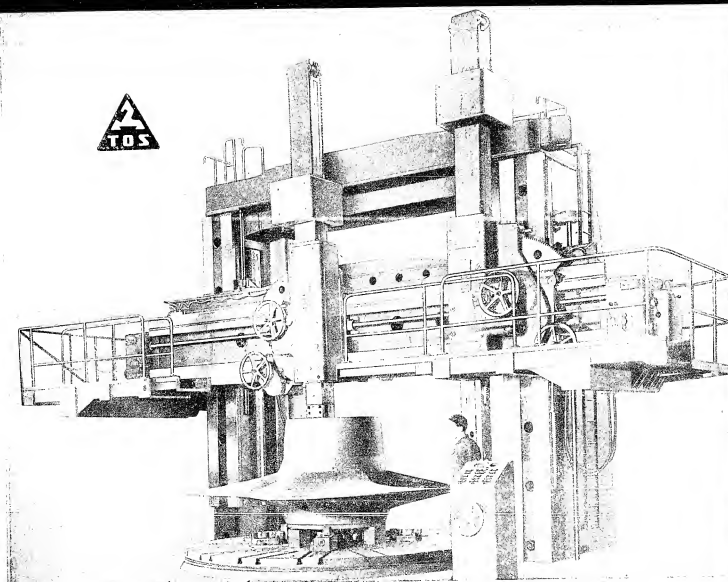
PRAHA - CZECHOSLOVAKIA

SPECIFICATION

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	SK 40	SK 50
Maximum diameter of turning by means of side arm	mm 4000 157 1"	mm 5000 196 7"
Maximum diameter of turning by means of tool arms (with side arm lowered below clamping plate)	mm 1200 47 1"	mm 1200 47 1"
Diameter of clamping plate	mm 1750 68 7"	mm 1750 68 7"
Maximum vertical distance, clamping plate to tool holder of tool arms	mm 2500 98 2"	mm 2800 110 1"
Maximum vertical distance of side arm	mm 2100 82 7"	mm 2600 102 3"
Vertical travel of tool arm arm	mm 1100 43 1"	mm 1400 55 1"
Horizontal travel of side arm arm	mm 1250 49 1"	mm 1250 49 1"
Distance, centre of clamping plate to tool holder of side arm maximum	mm 2000 78 7"	mm 2500 98 2"
Distance, centre of clamping plate to tool holder of side arm maximum	mm 800 31 3"	mm 1300 51 2"
Jaws suitable for clamping workpieces with a diameter of from 1 to 10 inches	mm 325 12 5/8"	mm 725 28 5/8"
Vertical travel of cross rail	mm 2250 88 5"	mm 2750 108 1"
Maximum weight of workpiece	kg 10 000 22 000 lbs	kg 10 000 22 000 lbs
Swivel of tool arm frame		
toward center	45°	15°
away from center	30°	30°
Maximum torque on clamping plate	kcm 18 000 120 000	kcm 22 500 160 000
Infinite speed variation		
1st range	0.11 to 1.85	0.25 to 1.55
2nd range	1.2 to 5.5	1.18 to 5.27
3rd range	5.95 to 22.5	1.0 to 17.5
Number of feeds in each direction	11	11
Rate of feed per revolution of table		
coarse	mm 0.25 to 22.1	mm 0.25 to 22.1
fine	mm 0.01 to 0.896"	mm 0.01 to 0.896"
fine-ton special request by replacement of a pair of gears	mm 0.125 to 11.2	mm 0.125 to 11.2
inches	0.005 to 0.448"	0.005 to 0.448"
Rapid travel of all tool arms and rails	mm per min 1200	mm per min 1200
inches per min	48	48
Hand feed of all tool arms per revolution of hand wheel	mm 2 5.64"	mm 2 5.64"
Rate of travel of cross rail per min approx	mm per min 200 7 8"	mm per min 500 19 6"
Approximate weight of machine with standard equipment	kg 30 000 66 000 lbs	kg 30 000 66 000 lbs
Approximate weight of machine with counterweight	kg 1 000 2 200 lbs	kg 1 000 2 200 lbs
Approximate weight of combined taper turning and screw cutting attachment	kg 550 1200 lbs	kg 550 1200 lbs
Electrical equipment for 3 phase, 1 wire power supply, 380 Volts, 50 cycles		
1 Ward-Leonard set with 3 phase motor	kW 100	kW 100
1 D. C. driving motor for constant output of 60 kW, 13.5 speed variation at constant output		
1 phase motor for raising the cross rail	kW 20	kW 20
2 phase motors for clamping the cross rail, each	kW 1.1	kW 1.1
1 phase motor for oil pump	kW 2.2	kW 2.2
5 phase motors for tool arm travel, engagement of clutches	kW 12.8	kW 12.8
lubrication feed boxes total approx	kW 6.1	kW 6.1
4 motors as above for lateral carriage, total approx	kW 6.1	kW 6.1



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DOUBLE STAND VERTICAL TURNING AND BORING MILLS

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS.
The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.

STROJEXPORT PRAHA, CZECHOSLOVAKIA

COK 526310-500

Printed in Czechoslovakia

ADEQUATELY HIGH SPEED

affords high cutting speeds resulting in full utilization of tools made of high speed steels and hard alloys.

INFINITE SPEED VARIATION

permitting most suitable cutting speed to be selected even during operation when tool is cutting.

ENGAGEMENT AND DISENGAGEMENT OF FEEDS

as well as of rapid travels, vertical and horizontal and their adjustment controlled by conveniently arranged push buttons.

RELEASING AND CLAMPING OF CROSS RAIL

to stands operated by push button controlled electric motor.

IDLE TIMES

reduced to minimum by reduction of number of controls and their convenient and clear layout.

CONTROL

of entire machine mostly by push buttons from crannies as well as remotely from control desk. Platforms and ladders afford access to and control from all workposts.

LUBRICATION

of all important mechanisms automatic by special oil pumps or oil baths. Lubrication of guideway and clamping plate entirely independent and checked by means of thermometers with remote signaling by sound and light.

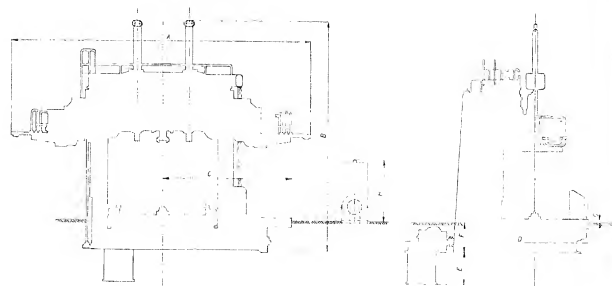
GEARS

manufactured of special steel. Highly stressed gears hardened and, if necessary, ground. Sliding gears fitted on spline shafts. Shafts running mostly in anti-friction bearings.

STANDARD EQUIPMENT:

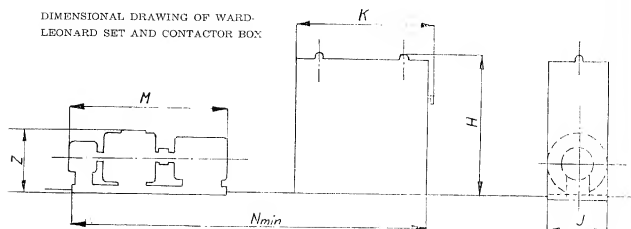
- 4 chuck jaws
- 2 multiple tool blocks
- 1 grease gun
- 1 set of spanners in separate cabinet

DIMENSIONAL DRAWING OF MACHINES

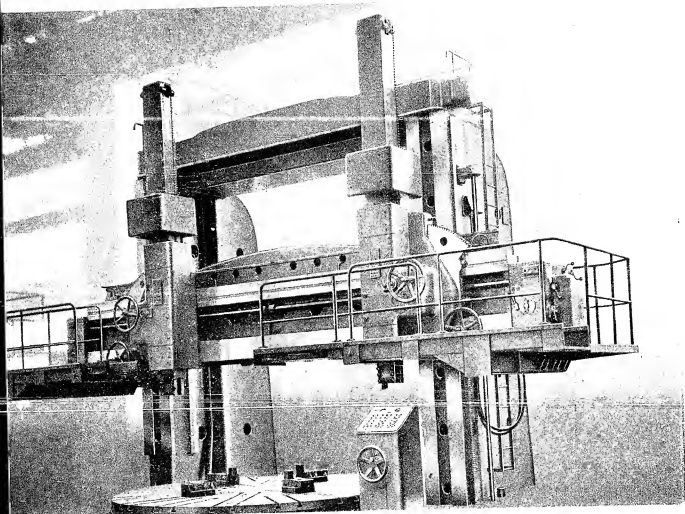


	A	B	C	D	E	F	G	H
Type SK 40	mm 10500	7000	1785	6530	1100	960	200	2000
feet - inches	34' 9"	23' 11"	5' 8"	21' 8"	3' 7"	3' 3"	8"	6' 7"
Type SK 50	mm 12000	8400	3285	7080	1100	960	200	2000
feet - inches	41' 4"	27' 7"	17' 4"	23' 5"	3' 7"	3' 3"	8"	6' 7"

DIMENSIONAL DRAWING OF WARD-LEONARD SET AND CONTACTOR BOX



	H	J	K	Z	M	N minimum
mm	2000	900	2050	965	2580	5400
feet - inches	6' 7"	2' 11"	6' 9"	3' 2"	8' 6"	17' 9"



The machines are intended for the heaviest turning operations. The latest discoveries on heavy machine tools were utilized in the design of both types so that these machines correspond to modern technical progress and satisfy the most exacting demands of production. They are marked by a high output, economy, precision of work, easy operation and reliability.

DESCRIPTION

THE DRIVE of the clamping plate is by a variable speed D. C. motor fed from a Ward-Leonard set, through a three speed gear box and a helical pinion and gear rim. The gear box with the motor is in the rear part of the machine. It is designed to slide out, whereupon it may be removed completely without it being necessary to remove the clamping plate. The speed of the clamping plate is controlled from the control desk and may be varied infinitely by means of push buttons in a range of 1:3.5 and by means of a hand wheel in three steps. A quick stopping of the clamping plate is achieved by electrical braking of the motor.

The drive can only be started when everything is lubricated, i. e. when the oil has passed through the guideways of the table. The oil pumps are started as soon as the main switch on the contactor box is closed.

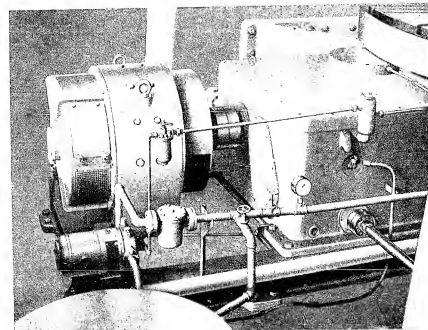
Emergency switches on the outer walls of both stands permit the whole machine to be stopped instantaneously.

THE TABLE is box shaped and has a flat guideway for the clamping plate. The simple shape of the guideway affords a high precision of manufacture. The table is provided with reinforcing ribs which make it very rigid.

THE CLAMPING PLATE has a high cross section and is generously reinforced with ribs to avoid distortion by the forces necessary for the clamping. It is provided with a particularly accurate flat guideway and rests in the centre on special antifriction bearings mounted on a fixed pin around which it revolves. The bearings and pin are of sufficient dimensions to withstand the heaviest radial and axial loads. The clamping surface is provided with T-slots and recessed dogs for securing the clamping jaws in position.

THE CROSS RAIL. The table, stands and top cross member form an enclosed frame the rigidity of which is further increased by clamping the cross rail to the stands. The cross rail is guided on both stands and its large cross section and diagonal ribs make it very rigid. The clamping of the cross rail to the front and side surface of the guideways of the stands is done by electric motors controlled by push buttons on the control desk. The cross rail is raised and lowered by an electric motor fitted on the top cross member. The motor can only be started when the cross rail is released. The extreme positions of the cross rail are limited by limit switches. The entire control and signalling of the cross rail are centralized on the control desk. The cross rail can only be moved when the drive is at rest and the drive can only be started when the cross rail is clamped to the stands.

DRIVE ASSEMBLY AND LUBRICATION

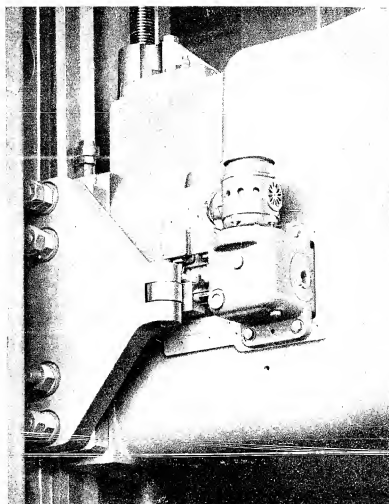


THE TOOL ARMS. Two tool arms slide along the cross rail. They are provided with swivelling parts in which the rams are guided, which have a square cross section and into the tapered holes of which the multiple tool blocks are inserted. The rams are prismatic and rest on flat guiding surfaces in the direction of the main thrust. The great height and width of the tool arm slide ensure that it is guided smoothly even though the ram may have been moved forward considerably. The two tool arms are mutually entirely independent. They are moved horizontally by a screw, vertically by a pinion and rack. Both tool arms may be moved inward as far as the centre of the clamping plate. The ram is balanced by a counterweight. Its swivelling part may be swivelled by means of a worm and worm gear and secured in any position. At the end of the cross rail a separate feed box is provided for each tool arm with a motor for rapid travel. Hand wheels for fine horizontal and vertical travel are fitted on the tool arms. The hand travels are driven through differential gears and are therefore independent of the power feeds. During power feed or rapid travel the hand wheels remain at rest but the movement may be speeded up or slowed down by means of them. Also fitted on the tool arms are push buttons for starting and stopping the feeds and rapid travels. Push buttons are also provided on the control desk for remote control of the tool arms. All automatic movements of the tool arms are stopped in their extreme positions automatically by means of limit switches. Limit switches are also provided to prevent the tool arms from hitting each other.

Disc gauges are fitted on the tool arms for a coarse setting of the tool for diameters and heights. The scales of the gauges are adjustable and permit the tool to be set as required for height and diameter in relation to the original position.

LUBRICATION. The electric motor driven oil pump draws oil from an independent oil tank through an electric lubrication guard and oil cleaner and supplies it to the guideways. The quantity of oil and the pressure, which is checked by a pressure gauge, may be adjusted by means of a pressure relief valve. The oil temperature in the guideways is checked by 4 built-in thermometers. When the oil temperature in the guideways reaches a predetermined figure a horn is sounded and a red light switched on on the control desk. The horn can only be switched off by means of the main switch. Another electric motor driven oil pump with lubrication guard and oil cleaner lubricates the gear box. The anti-friction bearings of the clamping plate have their own lubrication.

THE PLATFORMS. To facilitate operation two platforms are arranged on the machine the inner parts of which slide in and out for easier insertion of the workpiece.



SECURING OF CROSS RAIL IN POSITION

SPECIAL EQUIPMENT

THE SIDE ARM is guided on the right hand stand and may be lowered as far as the level of the clamping plate. It has its own feed box with an electric motor for rapid travel. The horizontal and vertical movements are driven by pinions and racks. The arm is balanced by a counterweight. Rotating scales similar to those on the cross rail tool arms are arranged on the side arm for a coarse setting of the tool for diameter and height. The arm is protected against hitting the cross rail and also against travel beyond its extreme bottom position by means of limit switches. Limit switches are also provided in the extreme positions of the ram.

THE TAPER TURNING ATTACHMENT for turning tapers by means of change gears is available for the right hand stand. It serves for turning inner and outer tapers with angles of 90° to 176° arranged in 2° increments without swivelling the ram. In conjunction with the swivel of the ram any taper from 0 to 176° can be turned.

THE SCREWCUTTING ATTACHMENT for cutting threads by means of change gears is available for the right hand stand and serves for cutting metric threads with pitches from 1 to 36 mm.

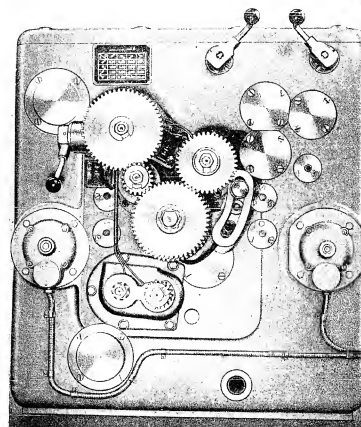
Since the majority of parts for taper turning and screw cutting by means of change gears are identical the two attachments are combined in a common design.

When the taper turning attachment is fitted to the feed box of the side arm outer tapers can be turned by means of it with angles of 4° to 90° arranged in 2° increments.

THE GEARS FOR FINE FEEDS. A pair of gears is available to be inserted into the feed box of the side arm on two pins when the feed box cover is removed. They serve for obtaining feeds of 0.125 to 11.2 mm ($0.005''$ to $0.448''$) per revolution of the clamping plate.

THE ELECTRICAL EQUIPMENT of the machine is designed for 380 Volts, 50 cycles, three phase, four wire. The motor for the raising and lowering of the cross rail as well as the motors for the rapid travel of tool arms and rams are provided with an Alnico for instantaneous stopping.

SCREW CUTTING ATTACHMENT



STANDARD EQUIPMENT:

Electrical equipment for the control of clutches and brakes — Chip pans — Drive plate — Reversing sleeve for auto spindle — 2 dead centres (Morse 5 and Morse 6) — Set of change gears for threads, for spindle speeds and for fine feeds — Support of lead screw and longitudinal rods (for distance between centres of 2750 mm (108") upward) — Wheel puller for change gears — Gear quadrant for change gears for special threads — Four-way tool block — Screen type oil cleaner — Set of spanners — Operating tables (on machine) — Operating instruction booklet.

SPECIAL EQUIPMENT:

Cooling system including electrical equipment — Back plate for jaw chuck — 3 jaw face plate — Steady rest, small — Steady rest, large — Follow rest — Head travel of lathe — Rapid traverse including electrical equipment — Thread indicator — Lever operated movement of tailstock center sleeve — Pressure operated movement of tailstock center sleeve — Positive stop — Support

SPECIFICATION:

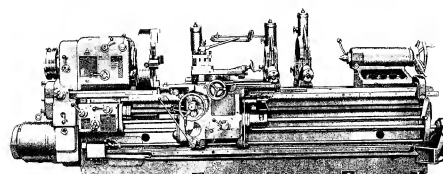
Swing over bed	800	31.5"
Swing over carriage	475	18.5"
Swing in steady rest	30-310	2"-12.2"
Swing in follow rest	200	7.8"
Distance between centres	200-800	7.8"-31.5"
Distance between centres with taper bar	700	27.6"
Bore of spindle	70	2.76"
Taper in spindle	80	3.15"
Taper of center	5	5
Outer taper of spindle	1651 x 95	1:3.056
Width of bed	498	19.6"
Diameter of face plate	310	12.2"
Diameter of driver plate	410	16.1"
Diameter of universal chuck	214 x 214	8.5" x 8.5"
Dimension of four-way tool block	40 x 40	1.57" x 1.57"
Maximum cross section of tool	120	4.72"
Diameter of tailstock center sleeve	335	13.2"
Movement of tailstock center sleeve	6	6
Taper in tailstock center sleeve	6000	12000 lbs
Maximum weight of workpiece	5 x 24	5 x 24
Spindle speeds: Number of speeds	42-315	42-315
Range of speeds: Series I	8-425	8-425
Series II	11.8-560	11.8-560
Series III	16-770	16-770
Series IV	21.2-1000	21.2-1000
Series V	40	40
Feeds: Number	0.058-6	42"-375"
Range of longitudinal feeds	12.6 of longitudinal feeds	12.6 of longitudinal feeds
Range of cross feeds	0.219-46	0.219-46
Diameter X pitch of lead screw	7-48	7-48
Threads	0.058-112	0.058-112
42 Whitworth threads per inch	3.5-192	3.5-192
48 module pitch per module	7.25-11.5	7.25-11.5
36 diametral pitch threads per inch dia.	5.1	16.77 per min.
36 circular pitch, pitch inches	1420 710	1420 710
Rapid traverse	17.5	17.5
Main drive motor, speed	R. p. M.	R. p. M.
output	KW	KW
Rapid traverse motor, speed	R. p. M.	R. p. M.
output	KW	KW
Coolant pump motor, speed	R. p. M.	R. p. M.
output	KW	KW
Motor of hydraulic system, speed	R. p. M.	R. p. M.
output	KW	KW
Weight of machine with standard equipment (3300 mm (138" limiting length)	7000	15500 lbs.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

As improvements in design are continually being made, the above specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STADJEXPORT
PRAHA - CZECHOSLOVAKIA

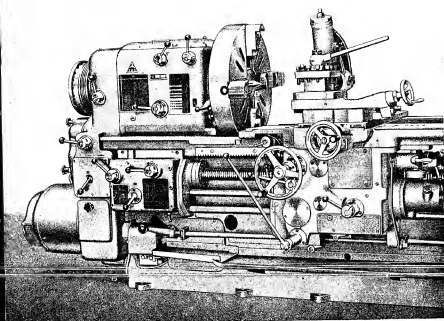
NEW CENTER LATHE Model SU80



This machine is intended for accurate machining operations using one or more tools and is particularly suitable for the single part production of non-uniform parts. It is equipped for the cutting of all kinds of threads in a wide range of pitches. The threads may be rough cut by means of the carriage feed driven off a rack and pinion. That saves the leadscrew which is only used for accurate finishing of threads. The attachments and instruments supplied as special equipment make this machine universal and increase its applicability to all turning operations.

The machine is marked by a wide range of spindle speeds, a high capacity and a high precision and affords an economic utilization of cemented carbide tipped tools at tools with a negative rake of high cutting speeds.





CENTER LATHE Model *SU80*

DESCRIPTION

THE HEADSTOCK

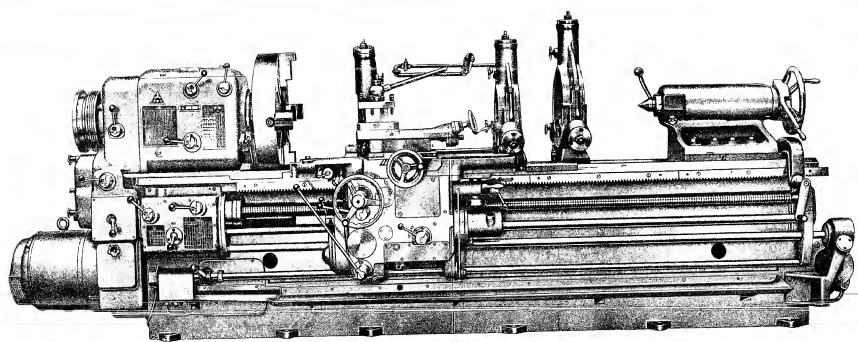
is formed by a rigid, completely enclosed box which reduces vibrations to a minimum even at maximum load of the machine.

The main spindle is driven by a two speed pole-changing a. c. squirrel cage induction motor through a twelve-step gear box with three pairs of change gears giving five different ranges of basic speeds of the main spindle. Precision machining is ensured by a sturdy system of bearings of the main spindle comprising adjustable double-row anti-friction bearings and by a dynamic balance of rotating parts.

The direction of rotation of the spindle is reversed by reversing the main drive motor. That applies to normal turning as well as to threading.

Two multi-plate clutches in the gear box serve for engaging and disengaging the gears and are controlled by a hydraulic cylinder acting through the centre of the hollow shaft.

Two efficient shoe brakes are provided for quickly stopping the main spindle and for quickly changing its speed. One of them acts upon the lower countershaft near the main motor, the other one directly upon the main spindle.



The front end of the spindle is provided with an ISA taper. It affords an easy exchange of chucks and prevents them from working themselves loose when reversing the spindle rotation.

THREADING BOX

The lathe is equipped with a large threading box designed for the cutting of metric, Whitworth, module, diametral pitch and circular pitch threads in a wide range. Each kind of threads is covered by a single setting of change gears. The threading box is sealed oil-tight and has no slot for the tumbler lever.

THE CARRIAGE

moves on the wide bed-ways. The longitudinal and cross feeds are operated by hand as well as by power. The tool slide is provided with a four-way tool block.

The longitudinal and cross feeds can be limited by automatic disengaging boxes with an accuracy of 0.01 mm (0.0004") which eliminate difficulties in keeping lengths within specified limits. The disengaging boxes control the disengagement of the apron box and disengage without shocks, because the positive stops work with low pressure.

They enable any one of 12 steps of the longitudinal or cross feed to be set quickly so that their use considerably increases the output of the lathe and it pays to adjust them even for a small number of pieces.

LUBRICATION

All rotating parts are pressure lubricated by means of plunger pump.

The bed and carriage guideways are centrally lubricated by a hand-operated lubricating system. The apron box is lubricated by its own eccentric driven plunger pump.

THE COOLING EQUIPMENT

consists of a 120 litres (26 1/2 imp. gallon) coolant tank, a centrifugal pump with independent electric motor drive and an adjustable piping for distribution to the cutting points.

ELECTRICAL EQUIPMENT

The electrical equipment of the whole machine consisting of remote controlled contactors with thermal overload protection and an ammeter is fitted in a self-contained cabinet erected at a suitable place separate from the machine.

SPECIFICATION:

Swing over bed	mm	630	25"
Swing over carriage	mm	375	15"
Swing in small steady rest	mm	220	8 1/2"
Swing in large steady rest	mm	300	12"
Swing in follow rest	mm	200	8"
Distance between centres	mm	1250, 2000, 2750, 3500, 5000, 6500, 8000	49", 79", 108", 138", 197", 256", 315"
Turning length with taper turning attachment	mm	650	25.6"
Bore of spindle	mm	60	2 1/4"
Taper in spindle	mm	M 70	1:20
Outer taper of spindle	mm dia	133.35	—3.5:12
Width of bed	mm	567	22"
Diameter of face plate	mm	650	26"
Diameter of driver plate	mm	300	12"
Diameter of universal chuck	mm	320	13"
Dimension of four-way tool post	mm	214 × 214 × 132	
Maximum cross section of tool	mm	8 1/2" × 8 1/2" × 5 1/4"	
Diameter of tailstock centre sleeve	mm	40 × 40	1.56" × 1.56"
Movement of tailstock centre sleeve	mm	120	4 7/8"
Taper in tailstock centre sleeve	mm	290	11 1/2"
Spindle speeds: Number of speeds	r. p. m.	No. 6 Morse	
Range of speeds: Series I	r. p. m.	5 × 24	
Series II	r. p. m.	8 to 375	
Series III	r. p. m.	10.6 to 500	
Series IV	r. p. m.	14 to 670	
Series V	r. p. m.	19 to 900	
Feeds: Number	mm per rev.	41	24
Range of longitudinal feeds	cuts per inch	0.064 to 6	0.109 to 6
Range of cross feeds	mm	4.23 to 373	
Diameter × pitch of lead screw	mm	0.382 times longit. feeds	
Threads: 48 metric	mm	60 × 12	
32 metric	mm	0.219 to 48	
37 Whitworth threads per inch	mm	0.219 to 48	
48 module, pitch per module	mm	7/16 to 48	
36 diametral pitch, threads per inch dia	mm	0.054 to 12	
36 circular pitch, pitch inches	mm	3 1/2 to 192	
Rapid traverse	metres per min.	7/256 to 1 1/2	
Main drive motor: speed	r. p. m.	5 16 feet per min.	
output	kW	1420/710	
Rapid traverse motor: speed	r. p. m.	17/10	
output	kW	1400	
Coolant pump motor: speed	r. p. m.	1.1	
output	kW	2775	
Motor of hydraulic system: speed	r. p. m.	0.3	
output	kW	1400	
Weight of machine with standard equipment (3500 mm/138" turning length)	kg	5800	12 800 lbs

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

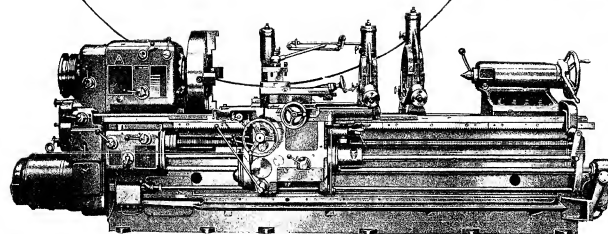
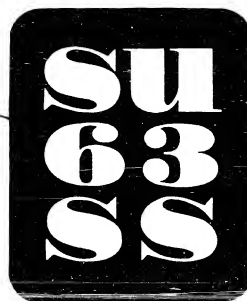
WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

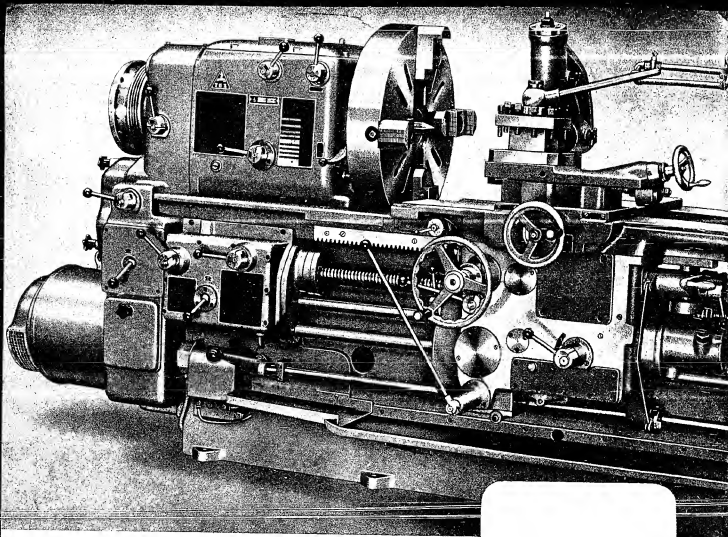
STROJEXPORT

PRAGA - CZECHOSLOVAKIA

NEW CENTRE LATHES

Type





63

NEW CENTRE LATHES TYPE

These machines are manufactured in two designs:

THE TYPE SU 63 UNIVERSAL CENTRE LATHE is intended for accurate machining operations using one or more tools and is particularly suitable for the single part production of non-uniform parts. It is equipped for the cutting of all kinds of threads in a wide range of pitches. The threads can be rough cut by means of the carriage feed driven off a rack and pinion. This saves the leadscrew which is only used for the accurate finishing of threads. The attachments and instruments supplied as special equipment make this machine universal and increase its range of application to all turning operations.

THE TYPE SS 63 PRODUCTION CENTRE LATHE is intended for single purpose work in large quantities. Various methods of turning are enabled by a range of attachments supplied as special equipment. Threads can also be cut on the machine within certain limits. Both designs are marked by a wide range of spindle speeds, a high capacity and high precision and afford economic utilization of cemented carbide tipped tools or tools with a negative rake at high cutting speeds.

STADJEXPORT

DESCRIPTION

THE HEADSTOCK is formed by a rigid, completely enclosed box which reduces vibrations to a minimum even at maximum load of the machine.

The main spindle is driven by a two-speed pole-changing A. C. squirrel cage induction motor through a twelve-step gear box with three pairs of change gears giving five different ranges of basic speeds of the main spindle.

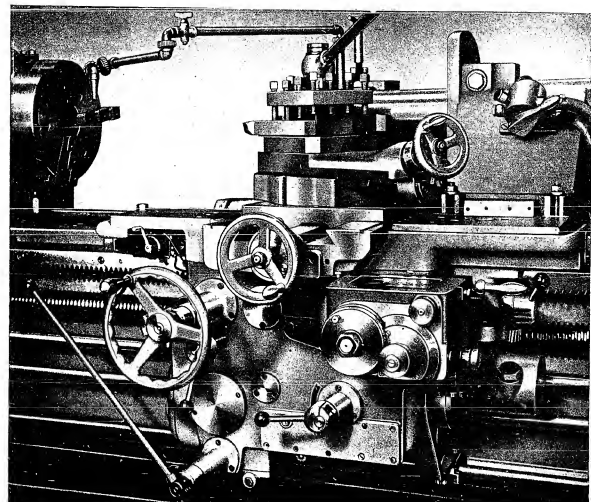
Precision machining is ensured by the sturdy system of bearings of the main spindle comprising adjustable double-row anti-friction bearings and by the dynamic balance of rotating parts.

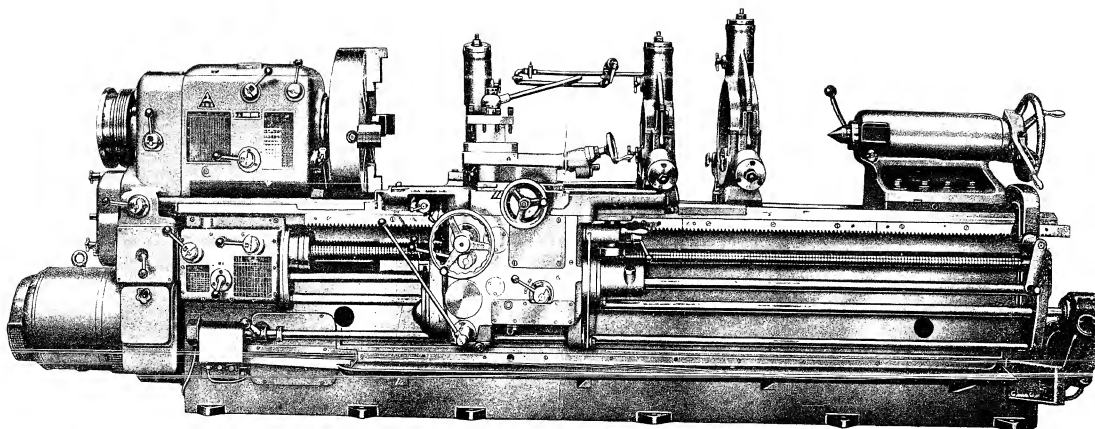
The direction of rotation of the spindle is reversed by reversing the main drive motor. This applies to normal turning as well as to screwcutting.

Two multi-plate clutches in the gear box serve for engaging and disengaging the gears and are controlled by a hydraulic cylinder acting through the centre of the hollow shaft.

Two efficient shoe brakes are provided for quickly stopping the main spindle and for quickly changing its speeds. One of them acts upon the lower countershaft near the main motor, the other directly upon the main spindle.

The front end of the spindle is provided with an ISA taper. It affords an easy exchange of chucks and prevents them from working themselves loose when reversing the spindle rotation.





THREADING BOX. The type SU 63 universal lathes are equipped with a large threading box designed for the cutting of metric, Whitworth, module, diametral pitch and circular pitch threads in a wide range. Each kind of thread is covered by a single setting of change gears. The screwcutting box is sealed oil-tight and has no slot for the tumbler lever.

The type SS 63 production lathes have only a small screwcutting box and no lead screw. Threads can only be cut in a limited range with pitches corresponding to the feeds.

THE CARRIAGE moves on the wide bed-ways. The longitudinal and cross feeds are effected by hand as well as by power. The tool slide is provided with a four-way tool block. The longitudinal and cross feeds can be limited by automatic disengaging boxes with an accuracy of 0.01 mm (0.0004") which eliminate difficulties in keeping lengths within specified limits. The disengaging boxes control the disengagement of the apron box and disengage without shocks because the positive stops work with low pressures. They enable any one of the 12 stops of the longitudinal or cross feed to be set quickly so that their use considerably increases the output of the lathe and it pays to adjust them even for a small number of pieces.

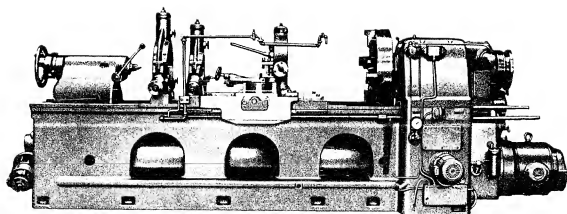
LUBRICATION. All rotating parts are oil lubricated from the drain piping of the hydraulic (plunger) pump. The guide surfaces of the bed and cross slide rest are lubricated by means of a hand distributor filled by the apron box pump.

The apron box is lubricated by its own eccentric driven plunger pump.

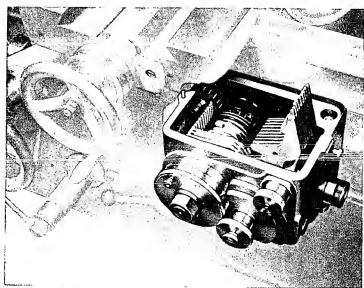
Self-lubricated sliding bearings made of sintered powder metal are used in all inaccessible places.

THE COOLING EQUIPMENT consists of a 120 litre (26½ imp. gallon) coolant tank, a centrifugal pump with independent electric motor drive and adjustable piping for distribution to the cutting points.

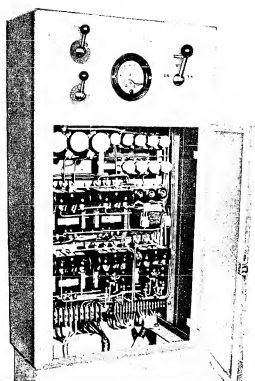
ELECTRICAL EQUIPMENT. The electrical equipment of the whole machine, consisting of remote controlled contactors with thermal overload protection and an ammeter, is fitted in a self-contained cabinet erected at a suitable place and separate from the machine.



Rear view of machine



Disengaging box of longitudinal feed



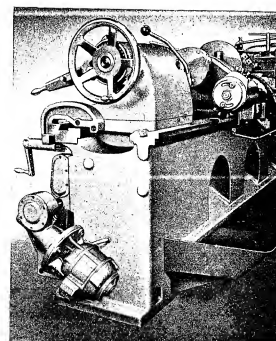
Electric control panel

STANDARD EQUIPMENT

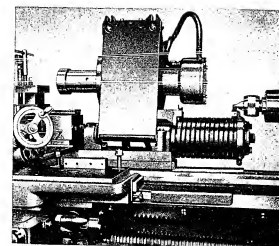
Electrical equipment including 2 electric motors — Hydraulic equipment for the control of clutches and brakes — Chip pan — Driver plate — Reducing sleeve for main spindle — 2 dead centres (Morse 5 and Morse 6) — 13 change gears for screwcutting (for type SU 63) — 6 change gears for spindle speeds (for type SU 63) — 2 change gears for screwcutting (for type SS 63) — 6 change gears for spindle speeds (for type SS 63) — Support of lead screw and longitudinal rods (for distance between centres of 2750 mm (108") upward) — Positive stop — Wheel puller for change gears — Fourway tool block — Screen type oil cleaner — Set of spanners — Operating tables (on machine) — Operating instruction booklet.

SPECIAL EQUIPMENT

Cooling system including electrical equipment — 3 - or 4 - jaw chuck with 320 mm dia. back plate — 4 - jaw face plate — Steady rest, small — Steady rest, large — Follow rest — Hand travel of tailstock — Rapid traverse including electrical equipment — Thread indicator (for type SU only) — Lever-operated movement of tailstock centre sleeve — Pressure operated movement of tailstock centre sleeve — Hydraulic copying attachment — Mechanical taper turning attachment — Pneumatic chuck — Disengaging box of longitudinal feed — Disengaging box of cross feed — Rear tool post with fixed head — Rear tool post with revolving head — Chamfering head — Folding boring head — Live centre — Lighting equipment.

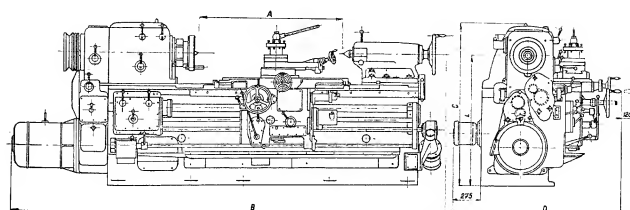


Drive of rapid traverse



Folding boring head

Amm	1250	2000	2750	3500	5000	6500	8000
Bmm	3742	4492	5242	5952	7492	8992	10492
Cmm	1398	1398	1398	1398	1398	1398	1398
Dmm	1683	1683	1683	1683	1683	1683	1683
Lmm	1120	1120	1120	1120	1120	1120	1120
Q kg	4600	5000	5400	5800	6600	7400	8200



50

THE CENTRE LATHES MODELS SU 50 AND SS 50

are built in two types:

1. UNIVERSAL LATHES MODEL SU 50
for the single part production
2. PRODUCTION LATHES MODEL SS 50
for the quantity production

In developing these machines our designers have always borne in mind to give them the following main features:
Increased efficiency of the machine and economical production.
Improved quality of products and enduring accuracy.
Ease of control and the non-productive time reduced to a minimum.

INCREASED EFFICIENCY AND ECONOMY OF PRODUCTION

1. The work spindle of the Universal Type has a wide speed range (11.2 to 1400 R. p. m.) which makes possible use of outside tipped tools and cutting of threads of large diameters with an adequately low speed.
2. With the Universal Type (SU 50) the output of the main drive motor is 16 HP, with the Production Type (SS 50) it is 30 HP.
3. The bed has the section of an enclosed girder and its rigidity is several times higher as compared with that of the previous types. This feature enables an easy removal of a large quantity of chips from the machine whereby the heating of the bed is eliminated.
4. The rigidity of the work spindle has been increased by the new and improved way of the spindle mounting. The improved spindle mounting has been obtained by the optimum distance between the bearings at a certain spindle diameter and by the spindle drive through a clutch, so that the spindle is not distorted by the bending stress resulting from the driving mechanism.
5. High rigidity of the headstock box obtained by the separate mounting of the headstock and gearbox.
6. Increased rigidity of the machine makes possible turning at a maximum torque of 31000 kgcm and producing a pressure of 1000 kg at the longitudinal feed.
7. The use of the tandem system of 2 driving motors facilitates frequent starting, stopping and reversing of the work spindle without employment of the multiple clutches. By the series and parallel connection of motors any impulses of current are eliminated, and the starting torque equals the nominal torque.
8. The work spindle nose is arranged as a long external taper to ensure the clamping of a gripping fixture without any play.

IMPROVED QUALITY OF PRODUCTS AND ENDURING ACCURACY

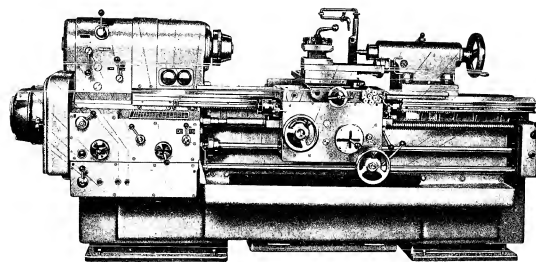
1. Increased rigidity of headstock, tailstock, carriage and bed.
2. Elimination of thermal distortions of the headstock and of components of the machine by separate mounting of the work spindle drive and of the headstock box.
3. Vibrationless work at a minimum play, enabled by the specially mounting in adjustable antifriction bearings.
4. Accurate adjustment to the dimensions of the workpiece facilitated by a relieved system of stops.
5. Increased accuracy of the longitudinal tool slide feed obtained due to the primitive tool slide-way.
6. The tool slide-way are arranged as hardened steel also and ensure enduring accuracy of the machine (supplied at no extra charge).
7. The screw tool post is fixed in position so that it may not move.
8. The bed and carriage guides are protected by guards against the entrance of impurities and chips.
9. The drill is clamped in a special device secured against rotation when drilling with the tailstock centre shank so that the taper hole is protected from damage.
10. All bearings have automatic lubrication the function of which may be easily checked.

EASE OF CONTROL AND THE NON-PRODUCTIVE TIME CUT TO A MINIMUM

1. Starting, stopping and reversing of the work spindle is effected by a handover for controlling the electric switches.
2. A part of the work spindle speed is to maintain as changed from the control box.
3. Changing of speeds is facilitated by a jog button device.
4. The selection of the feed direction and of the rapid traverse of the carriage is done by a single directional lever.
5. An individual electric motor started by a push button from the operator's position serves for ensuring the rapid traverse of the carriage.
6. For repeated operations both in the longitudinal and cross direction any number of positive stops can be used to enable the machining of stepped and intricate parts without measuring.
7. All controls are operated with a minimum of effort.
8. The carriage can be equipped with a tool post with quickly interchangeable tool holders which are adjustable for height.
9. The hydraulic Coupling Attachment makes possible machining of intricate parts.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

- 1 Main switch of the electric current
- 2 Pilot bulb of the main switch
- 3 Oil level gauge of the gear and of the thread boxes
- 4 Lever for changing the 8 rates of threads
- 5 Lever for changing the metric and Whitworth threads
- 6 Signal bulb for the parallel connection of motors
- 7 Push button for jogging and braking the spindle
- 8 Push button for changing the standard and coarse threads
- 9 Lever for changing the metric and Whitworth threads
- 10 Push button for engaging the tripple geared shaft
- 11 Lever for changing the right and left-hand thread
- 12 Lever for changing feeds and threads at the ratio of 1:1, 1:2, 1:4, 1:8
- 13 Oil level gauge
- 14 Wattmeter for the main drive motors
- 15 Longitudinal stop
- 16 Push button for engaging the draw-bar and the lead screw
- 17 Oil filling hole
- 18 Lever for operating the drum length stop
- 19 Push button for engaging the rapid traverse
- 20 Oil level gauge for the apron box
- 21 Hand wheel for the longitudinal feed
- 22 Hand wheel for the cross feed



- 23 Lever for operating the drum cross stop
- 24 Lever for locking the tailstock centre sleeve
- 25 Directional lever for changing the longitudinal and cross feeds
- 26 Lever for changing the 8 spindle speed rates
- 27 Indexing ring

- 28 Lever for engaging the clasp nut
- 29 Lever for starting and braking the motors
- 30 Push button for jogging the motors
- 31 Lever for starting the coolant pump
- 32 Pilot bulb for the coolant pump

50

SPECIFICATION

	SU 35		SS 35	
Swing over bed	mm	335	14"	mm 350 14"
Swing over carriage	mm	200	8"	mm 200 8"
Distance, center to center	mm	750, 1000, 1500 30" 40" 60"		
Turning length with taper bar	mm	250	10"	mm 250 10"
Spindle bore	mm	40		mm 40
Spindle taper	Morse	N° 5		Morse N° 5
Diameter of chuck	mm	190	7 1/2"	mm 190 7 1/2"
Taper in tailstock sleeve	Morse	N° 5		Morse N° 5
Maximum weight of workpiece	kg	400, 800 lbs.		kg 400, 880 lbs.
Spindle speeds: number		21		12
range		28 to 2800		224 to 2800
progressive ratio		1.25		1.25
Feeds: number		36		11
range of longitudinal feeds	mm per rev.	0.04 to 11		0.04 to 1.25
inches per rev.		0.016 to 7/32		0.016 to 0.05
range of cross feeds	mm per rev.	0.02 to 5.5		0.02 to 0.62
inches per rev.		0.008 to 7/32		0.008 to 0.025
Threads: metric	pitch mm	0.3 to 44; 39 in number		—
Whitworth	threads per inch	1/8 to 88; 54 in number		—
module, module		0.5 to 54; 37 in number		—
diametral pitch		1/4 to 88; 41 in number		—
Main motors:				
number of motors		2		2
speed	r. p. m.	1400—2800		r. p. m. 2800
output	HP	11		HP 20
Coolant pump motor:				
speed	r. p. m.	2800		r. p. m. 2800
output	HP	0.170		HP 0.170
Motor for rapid travel:				
speed	r. p. m.	1400		r. p. m. 1400
output	HP	0.7		HP 0.7
For center-to-center distance of	mm	1000 40"		mm 1000 40"
Floor space required (width X length)	mm	1200 X 3000		mm 1200 X 2900
inch		48 X 120		inch 48 X 116
Weight with standard equipment	kg	1800, 3970 lbs.		kg 1600, 3970 lbs.

NOTE: 4 different ranges of speeds can be engaged from the apron box. Altogether 9 ranges of speed can be obtained by means of change pulleys and a reduction gear.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.

As improvements in design are continually being made, the above specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STAT

CENTER LATHES

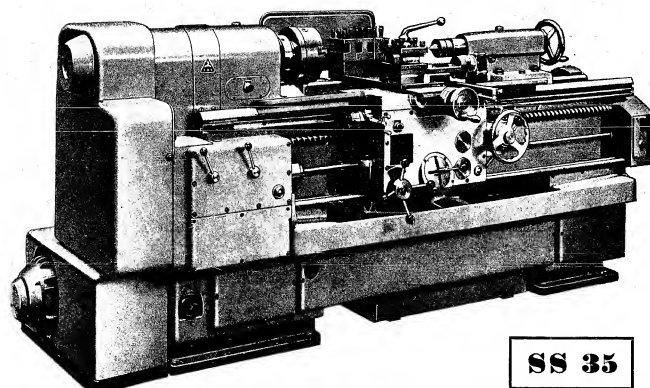
Type

SU-SS 35

These machines are being produced in two designs:

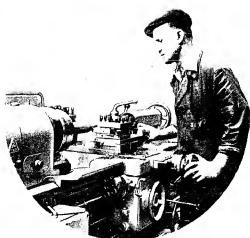
THE TYPE SU 35 UNIVERSAL LATHE for economical individual manufacture,
THE TYPE SS 35 PRODUCTION LATHE for economical quantity production.

Both types have a uniform basis of design and are arranged on the single purpose unit principle. They afford an economical utilization of cemented carbide tipped tools.


SS 35
STROJEXPORT PRAHA - CZECHOSLOVAKIA

COK 33327 a - 5911

Printed in Czechoslovakia



OUTSTANDING FEATURES

Increased Output of Machine

1. Use of high-power motors.
2. Increased rigidity of the main spindle, bed, headstock and tailstock.
3. Use of anti-friction bearings for the headstock spindle.
4. System of two driving motors permitting frequent starting, stopping and reversing of the headstock spindle without the use of a multiplate clutch.
5. Series-parallel connection of motors which is marked by the absence of starting current surges and a starting torque equal to the normal full-load torque.
6. Dual drive of the headstock spindle and feeds.
7. Automatic disengagement of feeds by means of relieved positive stops.
8. Quickly exchangeable tool-holder.

Improved Quality and Precision of Work

1. Increased rigidity of the machine-tool-workpiece system.
2. Headstock spindle drive separated from the spindle proper.
3. Use of anti-friction bearings for the headstock spindle with the possibility of eliminating radial play.
4. Relieved type of a system of stops which affords an accurate setting of the dimensions of the workpiece.
5. Increased hardness of the guideways of the bed.
6. Protection of the guideways of the bed and slides against the penetration of impurities and chips.
7. Efficient and reliable lubrication of bearings and guideways with the possibility of checking the functioning of the lubricating system.

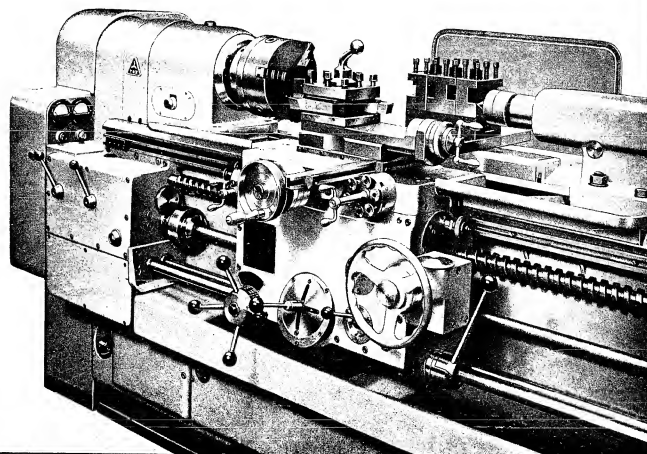
Improvement of Operation

1. Starting, stopping and reversing of the headstock spindle by an easily controllable lever operating the electric switches.
2. Simplified changing of speeds by impulse starting of the motor.
3. Engagement of feeds in all directions by means of a single directional lever.
4. A part of the range of spindle speeds and feeds (of the type SS) controlled from the operator's post near the apron box.
5. Relieved system of stops.
6. Power rapid traverse of the carriage.
7. Hydraulic copying attachment for the machining of intricate parts.

DESCRIPTION:

HEADSTOCK. The headstock spindle, which carries at its end a long taper and a flange, runs in anti-friction bearings. The front bearing is a double-row roller one and allows the radial play to be adjusted. The drive of the spindle of the type SS 35 is separated from the headstock body proper and arranged in an independent gearbox. The torque is transmitted to the headstock spindle by means of a non-rigid coupling so that the spindle is not subjected to any bending stress. The gearbox is driven by two motors arranged in tandem, the rotors of which are fixed to the two ends of the driving shaft of the gearbox. The engagement of gears is made possible by impulse starting of the motor by a special push button on the headstock as well as on the apron box.

The spindle speeds of the type SU universal lathe (a total of 21 speeds) are set partly by changing the number of poles of the motors (two motor speeds) and partly by slide gears in the gear box. There is a dual spindle drive, i. e. at lower spindle speeds (28 to 710 r. p. m.) by means of gears, at higher speeds (900 to 2800 r. p. m.) directly from the gearbox by V-belts, which reduces the peripheral speed of the gears. 6 speeds of the spindle may be engaged by remote control from the apron box. In the case of the type SS production lathe 9 series of speeds with an overall range of 224 to 2800 r. p. m. can be obtained by means of exchangeable pulleys and a reduction gear. 4 spindle speeds may be engaged by remote control from the apron box by means of sliding gears of the gearbox.

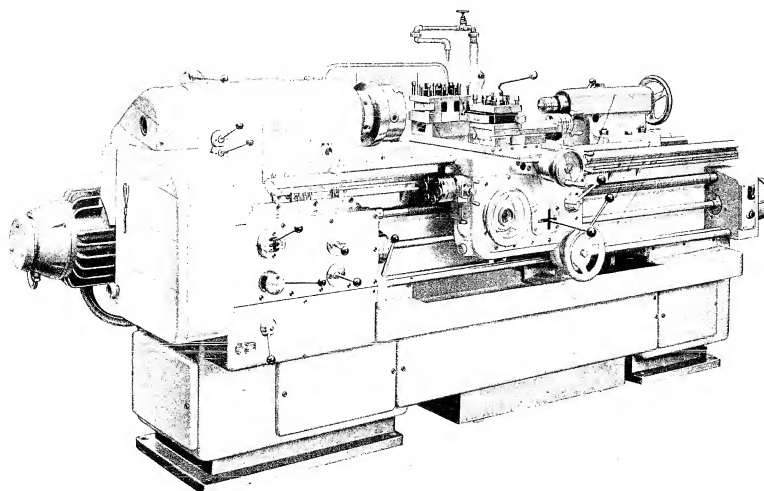


SS 35

CONTROLS

1. Main switch with pilot bulb.
2. Lever for engaging metric or Whitworth threads or feeds.
3. Lever for engaging 6 threads and feeds.
4. Lever for engagement of leadscrew or feed bar.
5. Ammeters of main motors.
6. Lever for engaging right and left hand threads.
7. Gear change lever for 1 to 1, 1 to 2 and 1 to 4 ratio of feeds.
8. Lever for engaging standard and steep threads.
9. Control lever of back gears.
10. Headstock motor inching and brake push button.
11. Oil flow indicator.
12. Stop drum for disengagement of longitudinal feed.
13. Hand wheel for longitudinal hand feed.
14. Directional lever for engaging longitudinal and cross feeds.
15. Lever for engaging clasp nut.
16. Hand crank of tool slide.
17. Tailstock sleeve locking lever.
18. Setting wheel for cross stops.
19. Headstock motor starting, stopping and reversing lever.
20. Hand wheel for engaging 6 spindle speeds with inching and brake push button.
21. Longitudinal and transverse rapid travel motor.

5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
4
3
2
1



FEED AND THREADING BOX

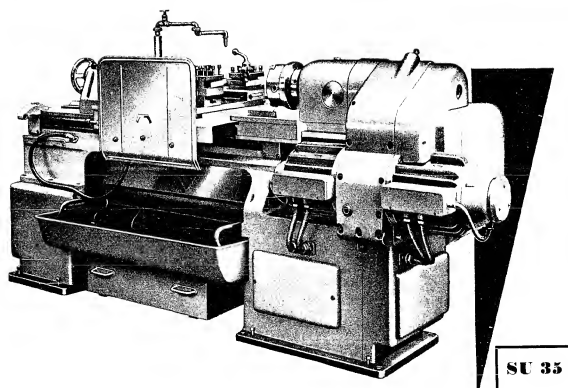
The feed and threading box is totally enclosed and the various feeds or thread pitches are set by sliding gears.

The type SU Universal Machine has a dual drive of this box. A belt drive from the gear-box is used for normal feeds in the entire range of spindle speeds. For threading and for high rates of feed spindle speeds up to 710 r.p.m. are used and the box is driven by change gears from the main spindle. This considerably reduces the peripheral speed of the gears.

In the case of the type SS Production Machine the box only serves for feeds and is driven by belts from the main spindle. Four rates of feed may be engaged directly in the apron box. Threads may be cut on this type of machine by means of a special threading attachment.

THE CARRIAGES

The feeds of the longitudinal as well as cross slides are engaged by a single lever on the apron box. The direction of the movement of the lever corresponds to the direction and sense of the engaged feed. The apron box also contains a mechanism for the automatic disengagement of the longitudinal and cross feed by a positive stop. A relieved system of stops permits any number of stops to be set. The feed is always automatically disengaged when the carriage encounters an obstacle or in case of overload of the tool by a component of the cutting pressure. The carriage also has a longitudinal and a transverse rapid travel for either direction. The rapid travel is driven by a separate electric motor controlled by a push button on the apron box. The return movement of the carriage during threading is obtained by reversing the spindle motor without disengaging the clasp nut.



The carriage of the type SU Universal Machine is driven, for turning, by a pinion engaging with a rack, for threading by a leadscrew and nut.

The carriage feed of the type SS Production Machine is driven by a coarse pitch screw spindle.

THE TAILSTOCK

The tailstock can be moved crosswise for turning long tapers. In the case of drilling by means of the tailstock the tool is inserted in a special insert secured in the tailstock sleeve against turning so that the taper taking the center is protected from damage. A tailstock with a hydraulic movement of the tailstock sleeve is available as special equipment.

THE BED

The cross section of the bed is designed as an enclosed beam with a high rigidity and permits a considerable quantity of chips to drop freely by the side of the machine to prevent the body of the bed from heating up.

The prismatic shape of the guideways of the slide increases the precision of the longitudinal movement. The guiding surfaces are designed as hardened gibs and ensure a lasting accuracy. They are protected by guards against the penetration of chips and impurities.

LUBRICATION

The headstock and gearbox as well as the feed box and threading box are lubricated by pressure oil supplied by a gear type oil pump fitted in the gearbox. An oil flow indicator on the headstock provides a check of the operation of the lubricating system. The change gears are lubricated by oil escaping from the labyrinth packing of the rear bearing of the headstock spindle.

The apron box is lubricated by pressure oil supplied by a piston pump.

The guideways of the longitudinal and cross slides are lubricated by a wick drawing oil from oil wells.

COOLING

The coolant tank forms, together with the electric motor driven coolant pump, a self-contained unit fitted in the space underneath the bed, with the chip pan situated above it. The electric motor of the coolant pump is connected by a cable with a plug to a socket on the machine.

ELECTRICAL EQUIPMENT

The machine is driven by two induction motors arranged in tandem and fed through contactors controlled by a change-over switch. The control circuits are fed through a safety transformer.

For the type SU machine 2-speed pole-changing motors are used. The controlling change-over switch has 3 positions: stop, forward and reverse. The forward and reverse speeds may be set mutually independently by means of independent speed selectors.

For the type SS machine single speed motors are used connected in series or parallel. The controlling change-over switch has the following positions: stop, forward in series, forward in parallel, reverse in series.

The push-buttons for the starting of the rapid travel and for the impulse control of the motor for easier changing of gears, which are fitted on the carriage box, are connected through a trolley wire arranged at the rear of the bed. A lamp fitted on the carriage is also fed from the trolley wire.

STANDARD EQUIPMENT

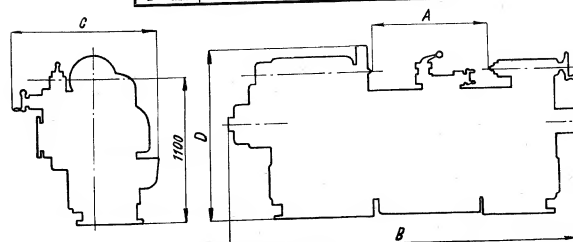
(for type SU 35, SS 35 machines)

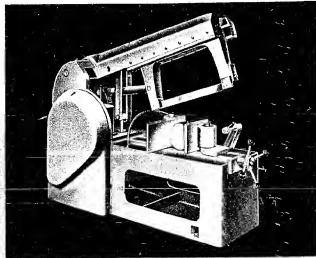
Face plate, driver plate, back plate for chuck, cooling system, rapid travel, electrical equipment including electric motors, electric light, system of stops including 18 stops, spring-loaded, stop, revolving tool head, tailstock inserts for N° 3 and 4 Morse taper shank drills, steady rest, follow rest, grease gun, spanners, belts, instruction booklet.

SPECIAL EQUIPMENT

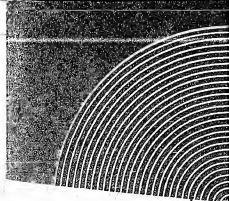
Graduated driver plate (for type SU 35 machine only), 2 drivers, steady rest up to dia. 160 mm, tool head for interchangeable tool holders, various types of interchangeable tool holders for tool head, self-withdrawing tool holder for screwcutting (for type SU 35 machine only), rear tool holder, rear compound rest, taper guide bar, measuring equipment, threading attachment (for type SS 35 machine only), chip guards (for type SS 35 machine only).

	SU 35			SS 35		
A mm	830	1080	1580	830	1080	1580
B mm	2750	3000	3500	2650	2900	3400
C mm	1300	1300	1300	1300	1300	1300
D mm	1300	1300	1300	1300	1300	1300



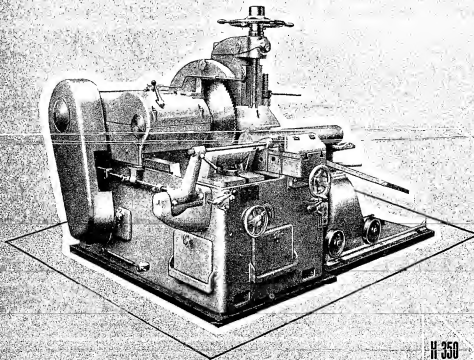


PR 30



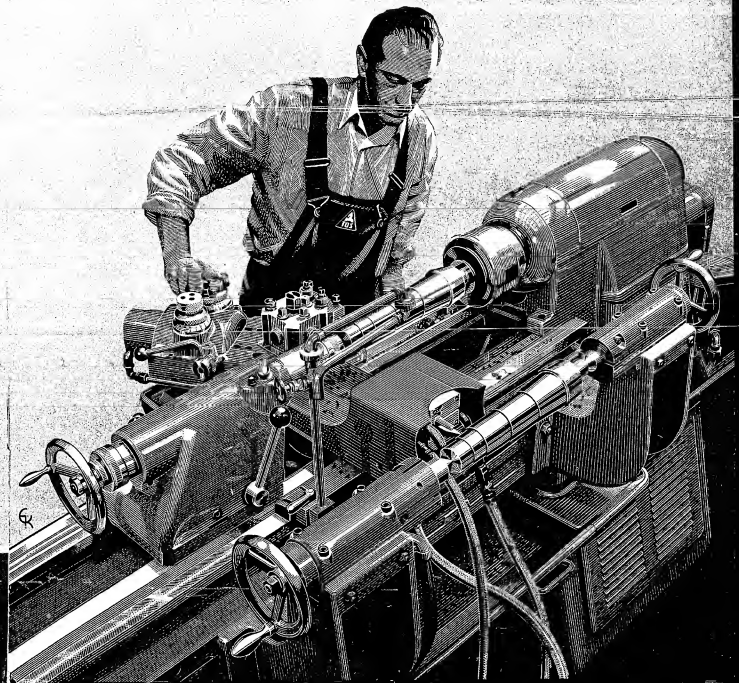
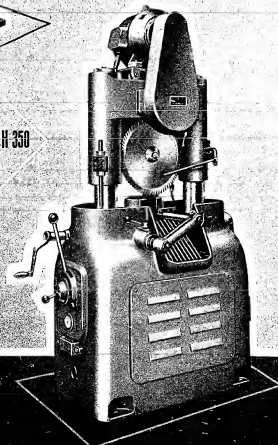
MACHINE TOOLS

STROJEXPORT

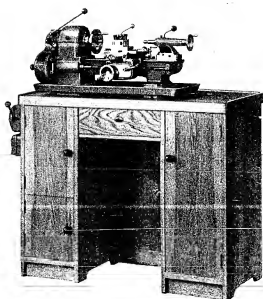


P 21

H 350

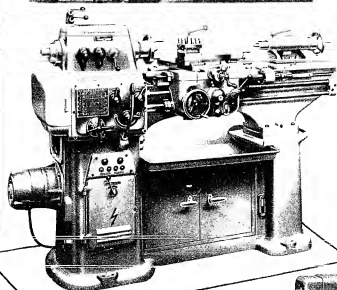


Model	Cutting capacity mm	inch	Remarks
P H 10	200	7.8	Hand saw Machine
P H 30	300	11.8	Hand saw Machine
P 27	270	10.6	Circular Saw
H 350	110	4.3	Circular Saw

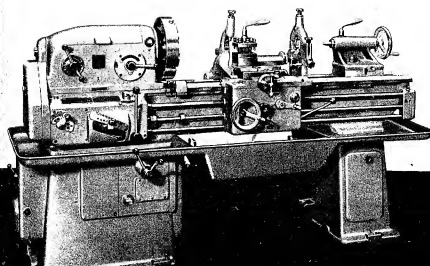
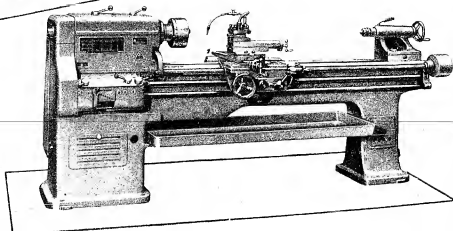


S 28

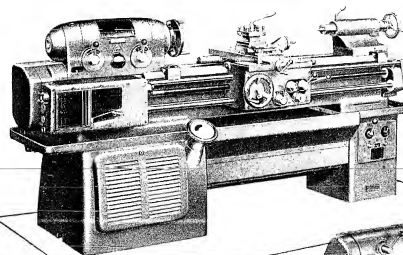
Mn 80



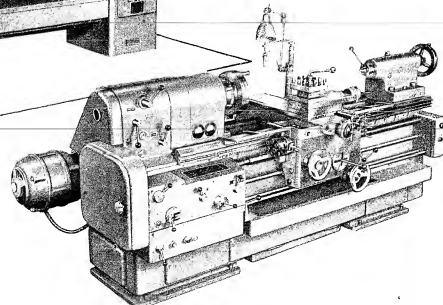
C 45



C 45

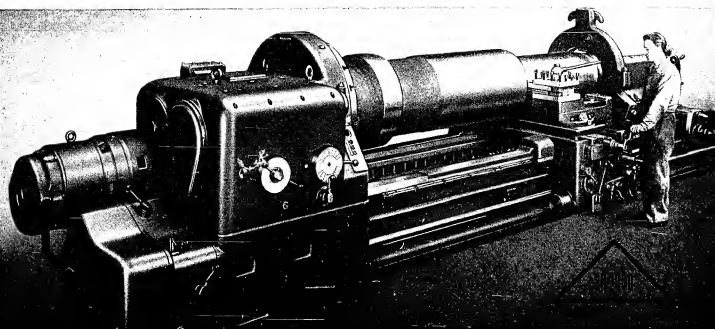


SV 18 R



SU 50

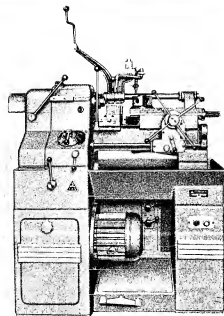
Model	Swing		Turning length		Remarks
	mm	ins.	mm	ins.	
Mn 80	160	6 1/4"	320	13"	Bench Type for precision mechanics
S 28	280	11"	750	29"	Universal Type
C 45	450	17 3/4"	1000, 2000	39 1/4", 79"	Production Type
SV 20	400	15 1/2"	1000, 1500	39 1/4", 59 1/4"	Precision Universal Type
SV 18 R	380	15"	750, 1000, 1500	30", 40", 50"	Special Precision Universal Type
SU 55	550	21 1/2"	750, 1000, 1500	30", 40", 50"	Precision Universal Type
SV 50	500	19 3/4"	750 to 3000	30" to 70"	Precision Universal Type
SV 65	650	25 1/2"	1275 to 3000	51" to 118"	Precision Universal Type
SV 80	800	31 1/2"	2000 to 3000	79" to 118"	Precision Universal Type
SE 50	500	19 3/4"	2000 to 3000	79" to 118"	Precision Universal Type
SE 1000	1000	39 1/4"	3000 to 3000	119" to 118"	High Speed Centre Type
SE 1250	1250	49"	3000 to 3000	119" to 118"	High Speed Centre Type
S 1600 B1	1600	63"	3000 to 10000	119" to 394"	Heavy Centre Type
S 2500	2500	98"	3000 to 10000	119" to 394"	Heavy Centre Type
S 3150	3150	124"	3000 to 10000	119" to 394"	Heavy Centre Type





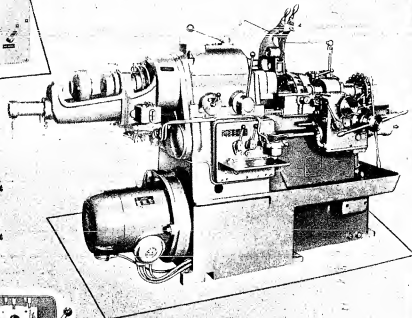
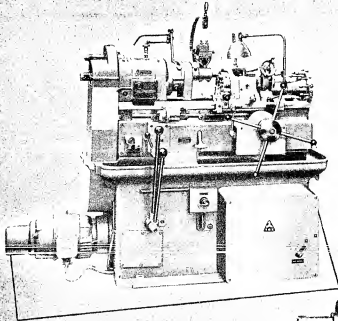
Capstan Lathes

R 12

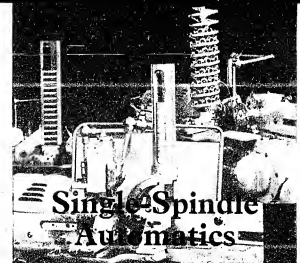
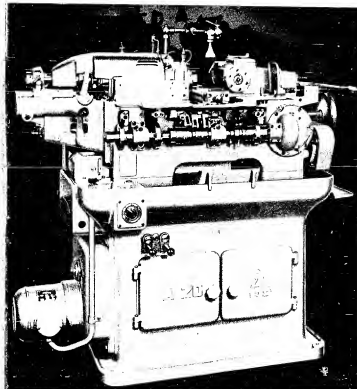
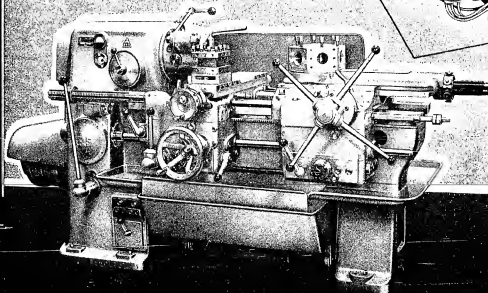


RT 34

RN 36



Model	Bar capacity mm	ins.	Remarks
R 12	12	0.47	with hexagon turret
RT 34	34	1.02	with drum turret
RN 36	36	1.54	with drum turret
R 3	30	3	with hexagon turret
RN 09	30	2.3	with drum turret



Single Spindle Automatics

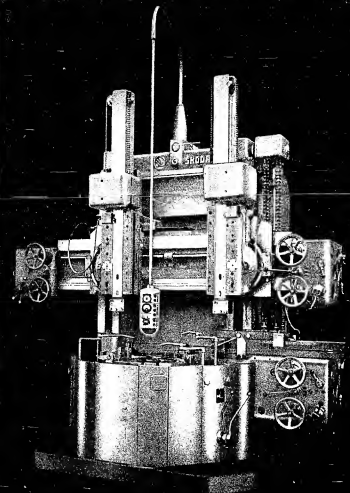
A 20

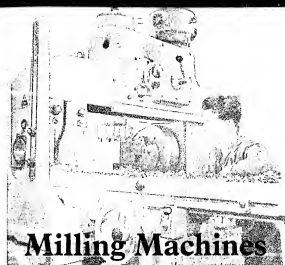
Model	Bar capacity mm	ins.
A 12	12	15/32
A 30	30	25/32
A 40	40	1 9/16

Vertical Turning and Boring Mills

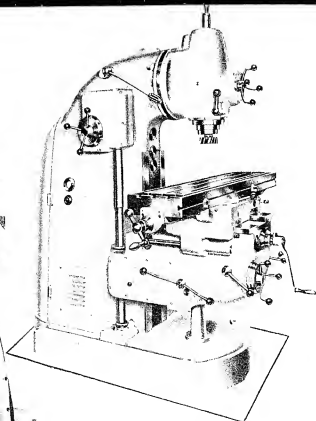
Model	Maximum diameter turned mm	ins.
SK 12	1250	49

SK 12

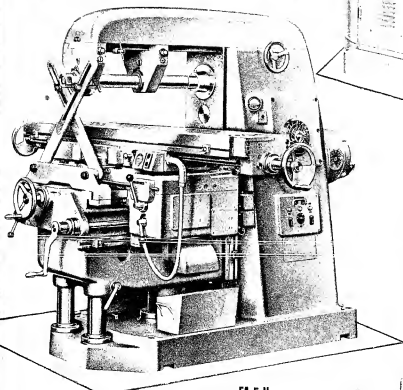




Milling Machines



FV 2a

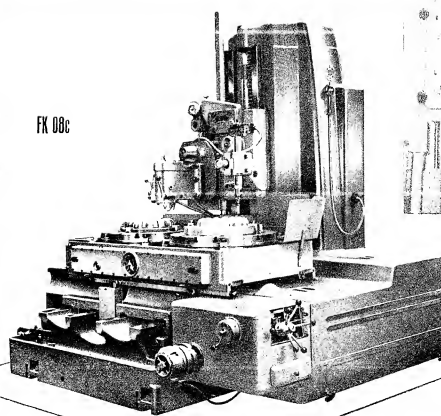
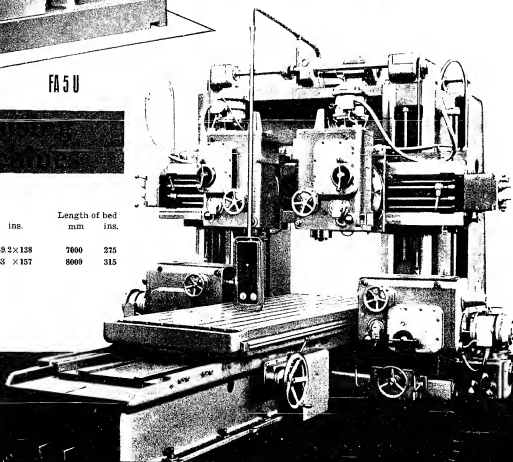


FA 5 U

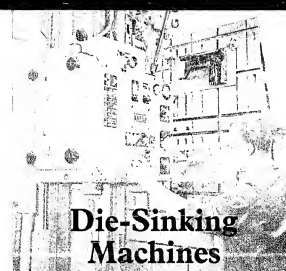
Model	mm	Table	Ins.	Remarks
F 13	2500 x 1500	21.6 x 5.9		Horizontal Type
FA 2a	1500 x 3000	53 x 11.8		Horizontal Type
FA 2H	1000 x 2000	39.5 x 7.8		Horizontal Type
FA 3H	1500 x 2500	49.2 x 9.8		Horizontal Type
FA 4H	1000 x 3125	63 x 12.5		Horizontal Type
FA 3H	2000 x 425	78 x 16.7		Horizontal Type
F 1S	500 x 1500	21.6 x 5.9		Vertical Type
FA 2a	1500 x 3000	53 x 11.8		Vertical Type
FA 2V	1000 x 2000	39.5 x 7.8		Vertical Type
FA 3V	1500 x 2500	49.2 x 9.8		Vertical Type
FA 4V	1000 x 3125	63 x 12.5		Vertical Type
FA 3V	2000 x 425	78 x 16.7		Vertical Type
FA 2a	1500 x 3000	53 x 11.8		Universal Type
FA 3H	1000 x 2000	39.5 x 7.8		Universal Type
FA 3U	1500 x 2500	49.2 x 9.8		Universal Type
FA 4U	1000 x 3125	63 x 12.5		Universal Type
FA 5U	2000 x 4000	78 x 15.7		Universal Type

Model	mm	Table	Ins.	Length of bed	mm	Ins.
FP 16	1250 x 3500	48.2 x 128		7800		275
FP 20	1000 x 4000	63 x 157		8000		315

FP 16



FK 08c



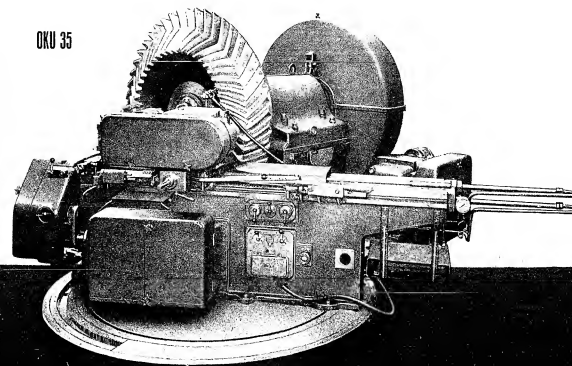
Die-Sinking Machines

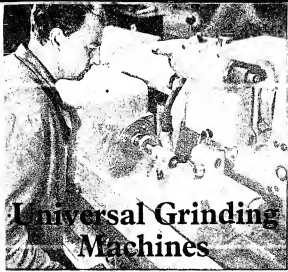
Model	mm	Table	Ins.	Highest position of cutter above table	mm	Ins.
FK 08a	1450 x 700	57 x 27.5		1025		40.3
FK 08b	1450 x 700	57 x 27.5		1025		40.3
FK 08c	2 x 700	2 x 27.5		850		37.4

Gear Milling Machines

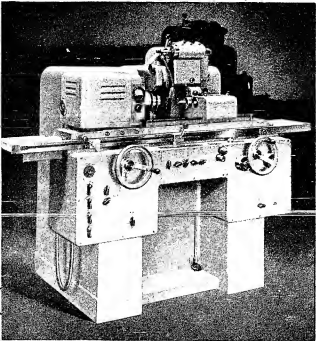
Model	Diameter of spur gear		Width of gear		Module
	mm	ins.	mm	ins.	
OKU 35	2250	88.5	630	24.8	35
OKU 50	5000	196	800	31.5	50

OKU 35

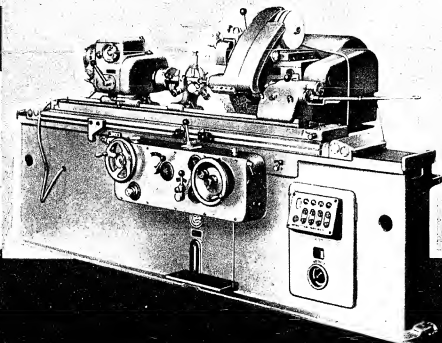




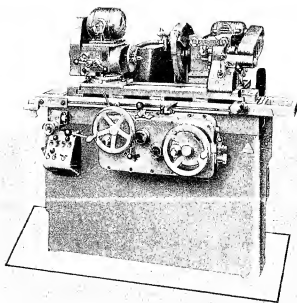
Universal Grinding Machines



BUA 20

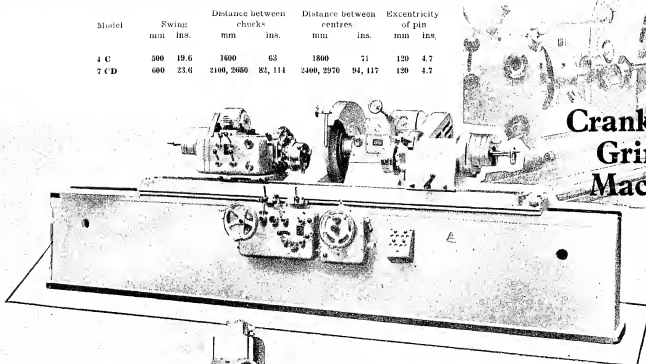


BK 5

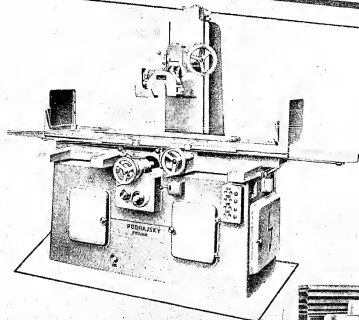


1 U

Model	Swing		Distance between centres	
	mm	ins.	mm	ins.
1 U	255	10	360	14
2 U	290	11.4	008-1000	19.6-39.4
BUA 20	290	7.8	450	17.7
BUA 31	315	12.4	1000-2000	39.4-78.7
5 U	400	15.7	1000-2000	39.4-78.7
6 U	500	19.6	1000-3000	39.4-118
7 U	600	26	2500-3000	98-118
BK 3	250	9.8	500, 750	19.6, 29.6
BK 5	315	12.4	750, 1000, 1500	29.6, 39.4, 59



4 C



BPH 300

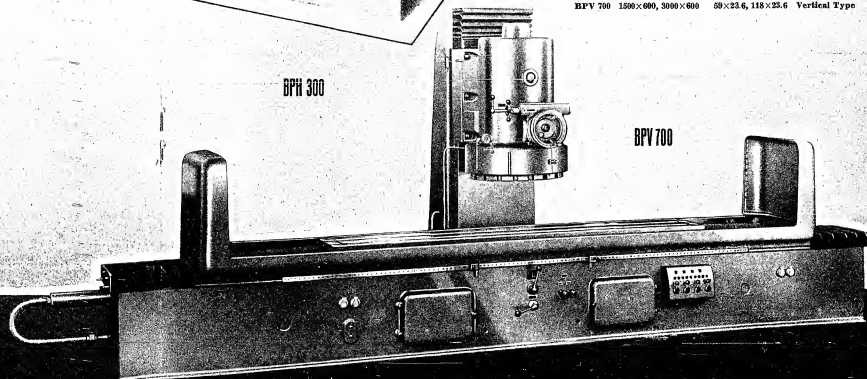


Crankshaft Grinding Machines

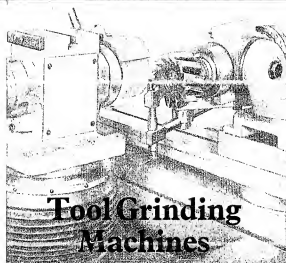
Model	Swing		Distance between chucks		Distance between centres		Eccentricity of pin	
	mm	ins.	mm	ins.	mm	ins.	mm	ins.
4 C	200	19.6	1400	63	1800	71	120	4.7
7 CD	600	23.6	2100, 2600	82, 114	2400, 2970	94, 117	120	4.7



Model	mm	Table	ins.	Remarks
BPH 20	630x300	24.7x 7.9		Horizontal Type
BPH 31	1000x315	39.5x12.4		Horizontal Type
BPH 500	1000x300	39.5x11.8		Horizontal Type
BPH 300	1000x300, 1500x300	39.5x11.8, 59x11.8		Vertical Type
BPH 700	1500x600, 2000x600	59x23.6, 118x23.6		Vertical Type

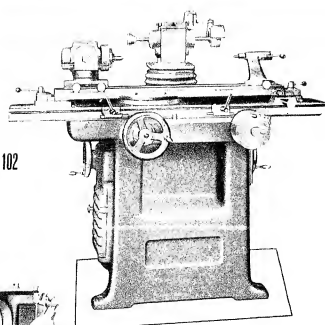


BPH 700

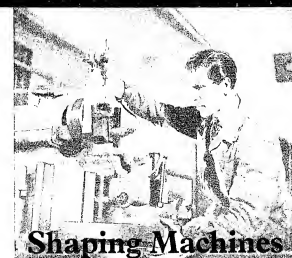
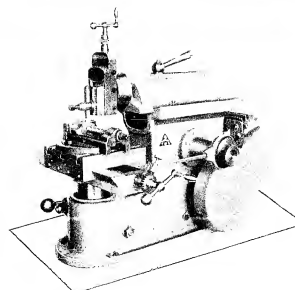


**Tool Grinding
Machines**

BN 102

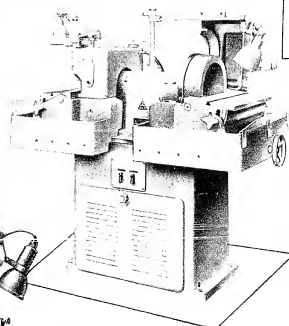


HO 20

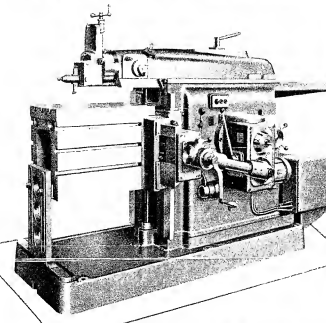


Shaping Machines

BBT 350



HO 63

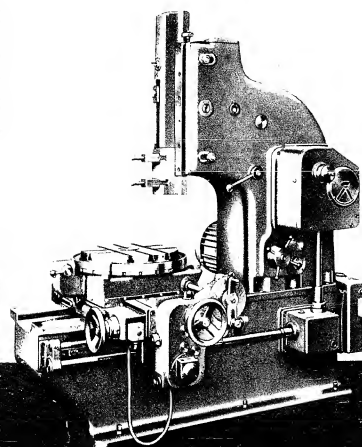
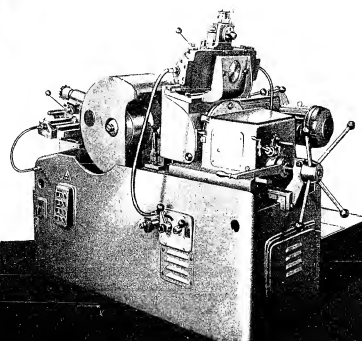


Model	Remarks
BN 102	Universal Tool Grinder
BBT 350	Carbide-tipped Tool Grinder
BBT 300	Carbide-tipped Tool Grinder
BNV 25	Twist Drill Grinder
BL 2	Duplex-wheel Tool Grinder
BL 4	Duplex-wheel Tool Grinder
BNO	Threading Die Grinder

Model	Table		Stroke	
	mm	ins.	mm	ins.
HO 20	200x200	7.8x7.8	200	7.8
HO 45	400x310	15.7x12.2	430	17.7
HO 63	500x400	19.7x15.7	630	24.8

Shaping Machines

Model	Diameter of workpiece	
	mm	ins.
BBT 60	3-60	1.8-2.38
BL 2	4-100	5.33-3.9



Model	Table		Stroke	
	mm	ins.	mm	ins.
HOV 16	320	12.6	160	6.3
HOV 25	500	19.7	250	9.8
HOV 300	900	31.5	300	11.8
HOV 63	1100	43.3	630	24.8

HOV 95

Planing Machines

HD 12,5

Model	Width		Planing length		Height
	mm	ins.	mm	ins.	
HD 12,5	1250	49	3000—12000	118—470	1250
HD 16	1600	63	4000—12000	157—470	1600
HD 20	2000	78	4000—12000	157—470	2000
HD 25	2500	98	4000—12000	157—470	2500

Chamfering Machines

Model	Chamfering length	
	mm	ins.
HMP 6	6000	236
HMP 10	10000	393
HMP 12	12000	470

HMP 10

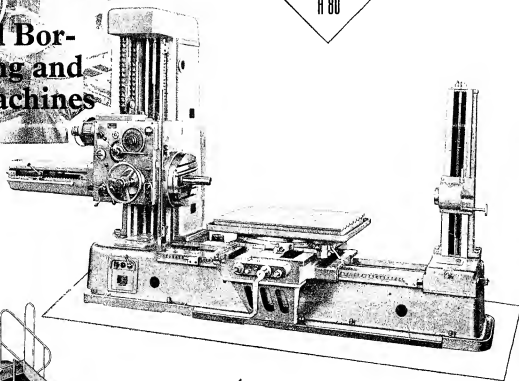
Radial Drilling Machines

VR 4

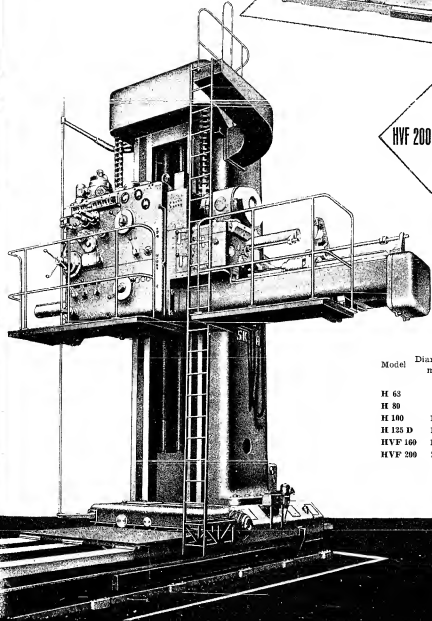
Model	Maximum distance, center line of spindle to column slings		Working surface of base	
	mm	ins.	mm	ins.
VR 2	800	31.5	800 × 700	31.4 × 27.6
VR 4	1255	49.4	1475 × 900	58 × 35.4
VR 6	2000	78	2850 × 1100	112 × 43
VR 8	2965	96	3380 × 1580	94 × 62
VR 8S	3150	124	3230 × 1970	127 × 78
VR 24	4000	157	4080 × 1570	160 × 78
VR 103	5150	203	3255 × 1780	127 × 70
VR 104	4000	157	4085 × 1780	160 × 70

VR 10

Horizontal Boring, Drilling and Milling Machines



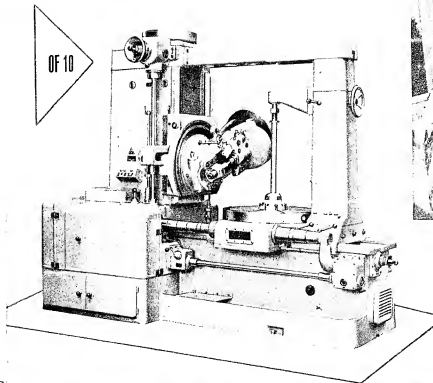
H 80



HVF 200

Model	Diameter of spindle		Table	Plate	
	mm	ins.	mm	ins.	ins.
H 63	63	2.48	710 x 990	28 x 35.5	
H 80	80	3.15	990 x 1120	35.5 x 44	
H 100	100	3.92	1120 x 1120	44 x 45	
H 125 D	125	4.92			
HVF 160	160	6.3	1600 x 1800	63 x 71	3500 x 2000 128 x 197
HVF 200	200	7.8			4000 x 2000 138 x 216

OF 10



Gear Hobbing Machines

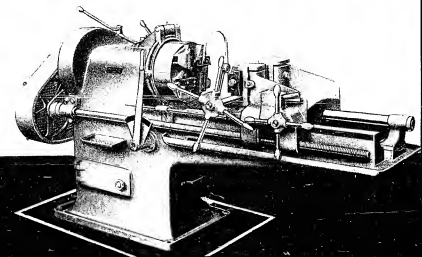
Model	Module	Maximum diameter of gear	
		mm	ins.
FO 6	6	800	31.5
OF 10	10	1000	39.4
OF 16	16	1600	63
FO 25	25	2000	118

Gear Shaping Machines

Model	Module	Maximum diameter of gear	
		mm	ins.
OH 4	4	200	7.8
OH 6	6	300	11.8

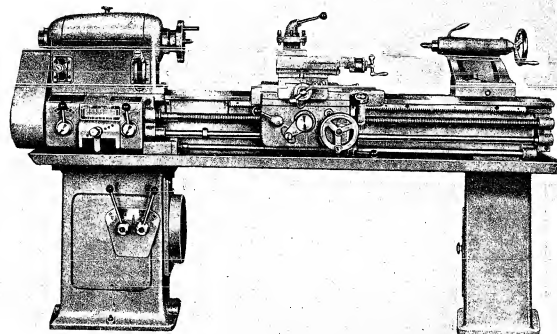
OH 6

Model	Threading capacity	
	M 16 — M 40	9/16" — 1 1/2"
ZV 1010		
Fv 5	M 20 — M 64	9/16" — 2 1/2"

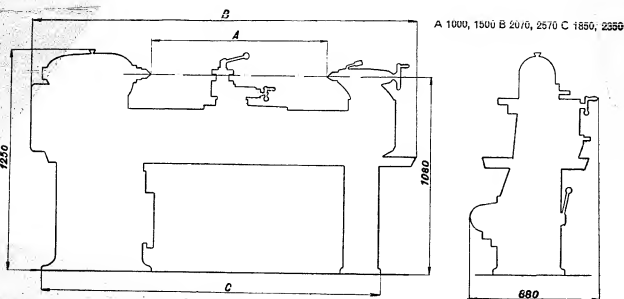


Specifications

	Metric	English
Swing over bed	390	15 1/4"
Swing in gap	550	21 5/8"
Useful clearance in front of face plate	175	7"
Swing over carriage	240	9 1/2"
Distance between centres	1000 or 1500	39 1/2" or 59"
Bore of spindle	35	1 3/8"
Taper in spindle	40	1 3/8"
Taper of lathe centres	2	2
Spindle nose according to DIN 800	M 60	M 60
Maximum swing with steady rest	90	3 1/2"
Maximum swing with follow rest	90	3 1/2"
Width of bed	255	10 1/4"
Diameter of face plate	360	14 1/8"
Diameter of catch plate	160	6 1/4"
Maximum section of tool	22	7/8"
Spindle speeds: Number	8	8
Range	30—750	30—750
Longitudinal feeds: Number	32	32
Range	0.06—0.92	cuts p. inch. 28—424
Cross feeds	0.02—0.31	cuts p. inch. 84—1272
Pitch of lead screw	4	4
Threads: Metric, pitch	0.2—6	0.2—6
Whitworth, threads per inch	7.5—40	7.5—40
Electric motor: Speed	1420	1420
Output	2	2
Dimensions and weights for distance between centres	1000 1500	39 1/2" 59"
Floor space required	880 × 2070 880 × 2570	34 1/2" × 81" 34 1/2" × 101"
Weight of machine: with standard equipment	785 845	lbs 1730 lbs 1860
with packing	825 880	lbs 1820 lbs 1940
with seaworthy packing	1055 1150	lbs 2320 lbs 2530
Contents boxed	3.1 3.8	cu. ft. 110 cu. ft. 134
Size of case	95 × 150 × 218	37 1/2" × 59" × 85"
	95 × 150 × 268	39 1/2" × 59" × 105"



CENTRE LATHE



As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

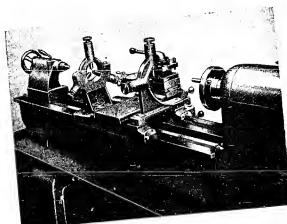
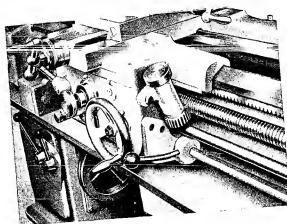
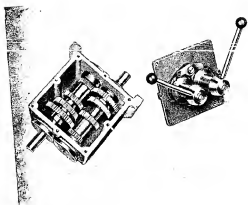
IN ORDERING, SPECIFY VOLTAGE, PHASE, AND FREQUENCY OF POWER SUPPLY



STROJEXPORT PRAHA — CZECHOSLOVAKIA

CENTRE LATHE 200

This machine is well-suited for all common turning operations with guaranteed accuracy according to Schlesinger limits. — Spindle speed range 30–750 R. p. M. — Feed range 0.06–0.92 mm rev. — Cutting of all commonly used metric and Whitworth threads. — Removable bridge in front of face plate. — Individual motor drive — Ease of operation.



Gearbox

Thread indicator

Steady and follow rest

Description



Headstock. The spindle runs in adjustable plain bearings. End thrust is taken up by an axial ball bearing. The spindle is driven from the gearbox located inside the column either directly or through a reducing countershaft.

The gearbox is totally enclosed and contains gears giving 4 spindle speeds changed by two hand levers. A special device does not permit to operate these levers simultaneously thus preventing any damage to the machine due to incorrect operation. The power is transmitted from the electric motor to the gearbox by V-belts.

The quick change gearbox enables a rapid selection of feeds and threads. The machine is adapted for cutting all commonly used metric and Whitworth threads.

The carriage with power longitudinal and cross feed is equipped with a 4-way tool holder.

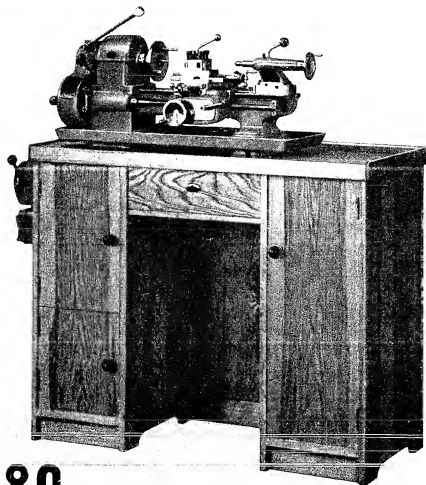
The bed has carriage guideways which are prismatic at the front and flat at the rear. In front of face plate a gap is provided with an accurately fitted removable bridge.

The tailstock is cross adjustable. The tailstock centre sleeve may be easily shifted.

Drive. The machine is driven by an electric motor attached to a slide for correct belt tension. Starting and stopping of motor is accomplished by a hand lever operated switch, the lever being situated on the right-hand side of the apron.

Standard equipment: 4-jaw face plate, catch plate, 4-jaw tool holder, steady and follow rest, thread indicator, 2 lathe centres Morse No. 2, reducing sleeves, set of change gears, set of spanners, operating instructions.

Optional equipment: flange for universal chuck dia. 190 or 210 mm.



MN-80 VOLMAN - BENCH CENTRE LATHE

Precision Centre Lathe for machining parts of all metals and plastics. It is especially well-suited for the branch of precision mechanics.

THE WORK SPINDLE is mounted in adjustable plain bearings and driven by an electric motor. Starting, stopping and reversing of this motor is done by a pole-changing switch. Six spindle speeds are obtained by a double-gearled swivelling countershaft and three-step pulleys with V-belts. The lead screw is driven by change gears from the work spindle through a planetary gear which reduces the adjusted pitch of thread to a fine feed in relation of 1:20.

THE CARRIAGE consists of a longitudinal and cross slide rest and of a swivelling tool slide. One lever operates the four-way tool block. The motion screws are provided with indexing rings. The screw nuts are adjustable to eliminate backlash.

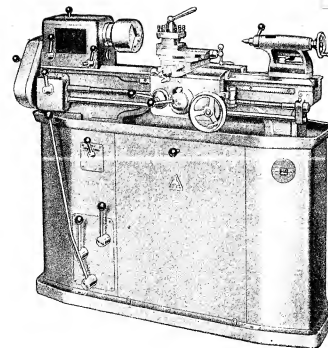
THE TAILSTOCK has V-guides and is fixed by an eccentric with the aid of a hand lever. A metric scale serves for accurate feeding of the centre sleeve when drilling. The indexing ring of the motion screw for the centre sleeve movement is fitted with a scale for accurate setting of the drilling depth.

THE BED has flat guides. The play in the front guide-way is eliminated by a taper gib.

THE BENCH. The machine rests on a wooden bench containing the electric motor with countershaft. In the bench drawers the change gears and equipment may be kept.

STANDARD EQUIPMENT: Electric motor with countershaft and pole changing switch, collet chuck attachment for clamping while cutting including 1 collet according to wish, chip pan, catch plate, 2 lathe centres, back-plate for scroll chuck, reducing sleeve, set of change gears, set of spanners, wooden bench, operating instruction booklet.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!



STAT

CENTRE LATHE Model JSO 5

This machine is intended for the precision machining of smaller parts. The carefully made box-type construction and the built-in powerful electric motor ensure an exceedingly high capacity of the machine.

THE SPINDLE is hardened and ground and runs in adjustable plain bearings. The machine can be supplied with either an electric motor of 1000 r. p. m., giving a speed range of 36—2100 r. p. m., or an electric motor of 1500 r. p. m. permitting the increase of speed range from 57—3000 r. p. m.

THE GEAR-BOX is located in the left-hand part of the column. Two levers serve for changing 10 spindle speeds arranged in geometrical progression. The gear-box is fitted with a double-type multiple disc clutch. The accelerated rapid return means a considerable saving of time when threading.

THE FEED-BOX allows for an unusually rapid feed selection in the ratio of 1:2, 1:4 or 2:1, 4:1, without any necessity of disturbing the set change gears.

THE CARRIAGE rides on long V-guideways provided with wipers to protect the bed from chips. The swivel tool-block may be secured in 8 positions.

THE APPRON is fitted with a thread indicator.

THE BED having ground trapezoidal slideways is firmly connected with both cabinet legs and the base to form with them a compact unit. A tool box is provided in the central part of the column to keep in the tools and equipment.

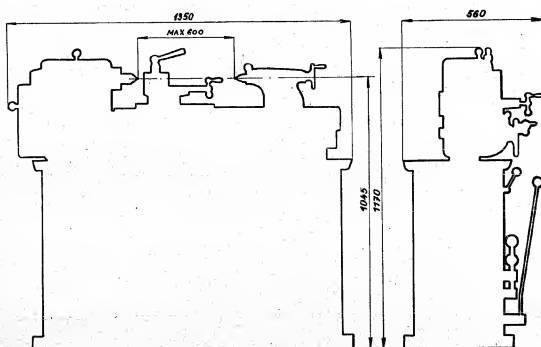
STANDARD EQUIPMENT: Electric motor with electrical equipment, face plate, catch plate, steady rest, follow rest, 2 lathe centres, reducing sleeve, 4-way tool block, set of change gears, grease gun, set of spanners, tool-box, operating instruction booklet.

OPTIONAL EQUIPMENT: Rise and fall rest, hand support, backplate for universal chuck \varnothing 115 mm, backplate for universal chuck \varnothing 140 mm, shank-type universal chuck up to dia. 10 mm, shank-type universal chuck up to dia 13 mm, collet chuck attachment, set of collets from dia. 2—15 mm, cooling attachment.

SPECIFICATIONS:

	Metric	English
Swing over bed	225	8 3/4"
Swing over carriage	135	5 1/4"
Distance between centres	600	23 1/2"
Width of bed	172	6 3/4"
Bore of spindle	25.5	1"
Taper of centres	4	2
Thread on spindle nose	M 45 x 4.5	M 45 x 4.5
Spindle speeds: Number	10	10
Range: Standard (motor n = 1000 r. p. m.)	36—2100	36—2100
High (on special order motor n = 1500 r. p. m.)	57—3000	57—3000
Acceleration of rapid return motion	1.5 x	1.5 x
Feeds: Range of longitudinal feeds	0.017—1.27	20—150 cuts per inch
Range of cross feeds	0.009—0.7	36—282 cuts per inch
Threads: 24 metric threads, pitch	0.25—6	1.5 x
24 Whitworth threads, pitch	t.p.i.	4—72
14 module threads, module	0.25—3.5	0.25—3.5
Diameter of lead screw	25	0.97"
Pitch of lead screw	4	4
Output of motor	0.75 or 1.1	0.75 or 1.1
Floor space required	650 x 1350	25 1/2' x 53'
Weight of machine: with standard equipment	kg 440	lbs 970
packed for rail	kg 490	lbs 1008
packed for overseas	kg 590	lbs 1300
Box measurements	cm 158 x 85 x 142	62" x 33 1/2" x 56"

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As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

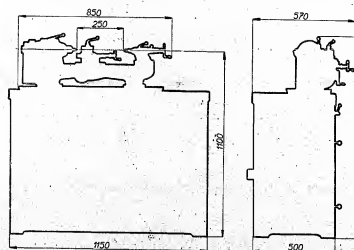
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SPECIFICATIONS:

	Metric	English
Swing over bed	160	6 1/4"
Distance between centres	280	11"
Swing over carriage	90	3 1/2"
Width of bed	120	4 3/4"
Diameter of face plate	150	5 7/8"
Bore of spindle	18	0.7"
Taper of centres	Morse 1	1
6 spindle speeds ranging from	r. p. m. 160—1600	160—1600
Feeds: 20 longitudinal feeds	mm/rev. 0.01—0.15	170—2540
Cuts per inch		
Pitch of lead screw	mm 3	
Threads: 20 metric threads, pitch	mm 0.2—3	
Main drive motor:		
speed	r. p. m. 1400	1400
output	HP 0.35	0.35
Weight of machine:		
with standard equipment	kg 175	386 lbs
packed for rail	kg 250	550 lbs
packed for overseas	kg 320	705 lbs
Floor space required	mm 500x1150	19" x 45 1/2"
Contents boxed	m ³ 1.2	42 cu. ft.

ADDITIONAL EQUIPMENT:

Half-centre, hollow centre, hollow half-centre, three-jaw chuck up to dia. 6 mm, collets, step chucks, ring chucks, polishing plate for emery cloth, tailstock rest plate, face plate with 4 reversible swivelling jaws, scroll chuck with 2 x 3 jaws, scroll chuck with 2 x 4 jaws, lever type drill tailstock, folding hand rest, indexing attachment for the work spindle, rise and fall rest with clamping angle iron, steady rest, follow rest, indexing attachment for the compound slide rest.

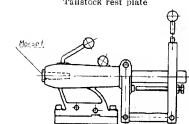


As improvements in design are continually being made, all above data are not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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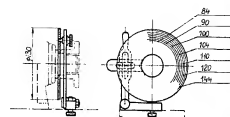
Tailstock rest plate



Lever type drill tailstock



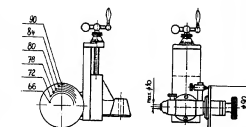
Folding hand rest



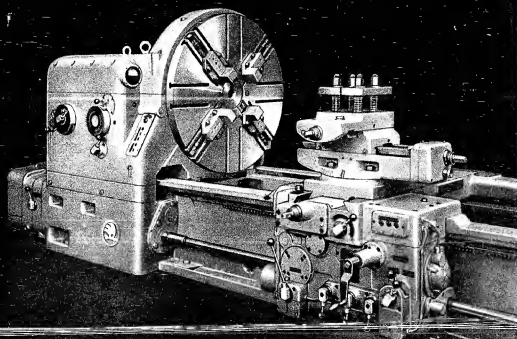
Indexing attachment for the work spindle



Rise and fall rest with angle plate



Indexing attachment for the compound slide rest



HIGH-SPEED CENTER LATHES

THE SKODA SR1000 CENTER LATHES ARE MANUFACTURED IN THE CZECHOSLOVAKIA FACTORY OF PRECISION MACHINE TOOLS, BRNO.

SR1000

OUTSTANDING FEATURES:

- ② high speed of main spindle
- ② wide speed range
- ② spindle running in anti-friction bearings
- ② high rigidity of machine
- ② simple operation of machine
- ② protected guideways of bed

DESCRIPTION

The Drive. The machine is driven by a three phase squirrel cage induction motor through a starting clutch which reduces the starting current surges in the main. The period required by the machine to come to a standstill is reduced to a minimum by an automatic brake operated by a solenoid. The motor is started and stopped by push-buttons on the headstock or on the carriage. The inching device with a push-button for slight rotary movements of the spindle facilitates the setting-up of the machine.

The Headstock is totally enclosed. Correctly arranged ribs reduce vibrations to a minimum. The main motor is fitted directly to the headstock and coupled to the drive shaft by means of a starting clutch. The speeds are changed by sliding gears fitted on spline shafts which run in anti-friction bearings. The hollow spindle runs in anti-friction bearings which ensure smooth and easy running. The thrust is taken up by an anti-friction thrust bearing.

All gears are made of special steel with hardened teeth. Gears for higher peripheral speeds have ground teeth. The headstock is centrally lubricated, the oil being circulated by an electric motor-driven gear pump. An oil cleaner and a lubrication guard with a light signal system of the operation of the pump are fitted in the circuit of the oil. A safety device prevents the main motor from being started when the pump is out of action and stops the motor automatically in the event of a defect of the lubricating mechanism.

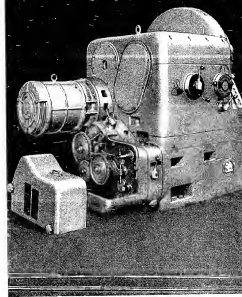
The Face Plate is made of cast steel. It is pressed to the end of the spindle and rigidly bolted to its flange. It is provided with four chucking jaws of special hardened steel.

The Bed is box shaped, generously reinforced with ribs and has wide, flat guideways. The chips drop through wide passages into collecting pans in a channel underneath the machine so that they are easy to remove without interruption of the work on the lathe. The bed is so designed that it can be easily extended in order that the distance between centers may be lengthened.

The Carriage has an independent feed box containing all the mechanisms for changing and reversing the feed and a motor for quick traverse. The carriage is provided with longitudinal and transverse slides and with an upper tool slide. The tool slide can be moved rapidly lengthwise and, on the type SR 1250, also crosswise. Apart from the usual feeds of the longitudinal and cross slides the tool slide, too, has a power feed and its guideways can be swivelled which permits tapers to be turned on the entire turning length. The feed can be disengaged during turning and re-engaged again without a shock.

The apron boxes are also provided with a safety device for protection against overload and against the carriage moving up against an obstacle.

The upper cross slide is easy to remove so that it can be easily replaced by a different, special slide, e.g. for the machining of crankshafts. The carriage is also fitted with an equip-



ment for the turning of tapers on turning lengths up to 5620 mm by a combination of the longitudinal feed and of feed of the swivelled top slide and by means of change gears for the turning of 1 : 50 tapers and steeper ones.

For the turning of steeper tapers than 1 : 50 the taper turning length is correspondingly shorter.

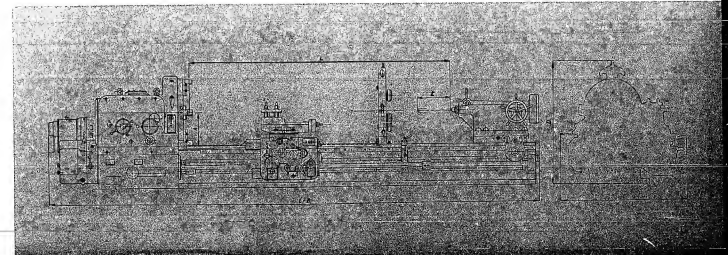
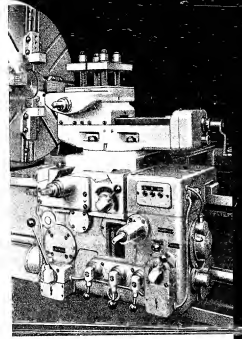
Screwcutting. Threads with currently used pitches can be cut by means of the usual gears of the carriage, i.e. of a pinion engaging with a rack on the bed. For the turning of precision threads the machine can be equipped with a lead screw which may be supplied with the machine as optional equipment. Threads can be cut on the entire turning length. A special 8:1 step-up gear permits the cutting of steep threads.

The Tailstock is moved along the bed by a crank and secured against reverse movement by a catch. The tailstock sleeve is moved by means of a hand wheel at the front of the tailstock. The standard dead centre can be replaced by a live centre (on the type SR 1000) or the tailstock sleeve can be replaced by another one with a built-in live centre. (The tailstock sleeve of the type SR 1250 is equipped only with a live centre.) The upper part of the tailstock can be moved crosswise within narrow limits.

The Rest is enclosed and divided. It has adjustable jaws with a flat guiding surface. They can be replaced by jaws with guide rollers.

The Controls of the machine are easy and quick to operate and are centralized at the operator's post. All motors are started and stopped by push-buttons, the arrangement being such that the main motor can be controlled from the headstock as well as from the carriage.

These Lathes are manufactured with centre-to-centre distances up to 12 metres (39'4") arranged in 1000 mm (3'3") increments.



SPECIFICATION

Swing over bed	mm	500	21.5"
Swing over gap	mm	350	13.4"
Swing over carriage	mm	300	12.7"
Width of bed gap in front of face plate	mm	250	9 13/16"
Width of bed	mm	400	15 3/4"
Maximum diameter of turning in steady	mm	150	5 7/8"
Diameter of face plate	mm	500	19 3/4"

HEADSTOCK

Number of main spindle speeds	r. p. m.	18
Standard range of spindle speed	r. p. m.	9.5 to 480
Increased range provided 1400/2800 r. p. m. motor and all hardened and ground headstock gears are supplied	r. p. m.	9.5 to 1000
Taper in main spindle 1:20, diameter	mm	65
Taper of centers	mm	No. 4 Morse
Diameter of bore of main spindle	mm	60

UNIVERSAL QUICK CHANGE GEAR BOX

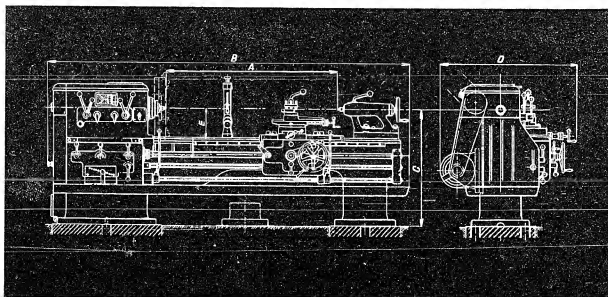
Number of longitudinal and cross feeds	mm	72
Range of longitudinal feeds per rev.	mm	0.03 to 8.3
Range of cross feeds per rev.	mm	0.01 to 2.8
Threads which can be cut: 55 metric	mm	1 to 229
72 Whitworth	t. p. i.	1/8 to 30
46 module	module	0.25 to 36
58 diametral pitch	D. P.	0.5 to 120
Diameter and pitch of lead screw	mm	55 X 1/2"
Output of motor, 1400 r. p. m.	HP	7.5
Output of motor, 2800 r. p. m.	HP	7.5/10

LINE SHAFT DRIVE

Diameter and width of driving pulley	mm	220/105
Speed of driving pulley per standard range of headstock spindle speeds	r. p. m.	720
Weight of machine, turning length 2000 mm (5'-9")	kg	2800
Weight of machine, turning length 3000 mm (9'-10")	kg	2980

The machines are continuously being improved upon. The particulars given in this prospectus are therefore not binding in detail.

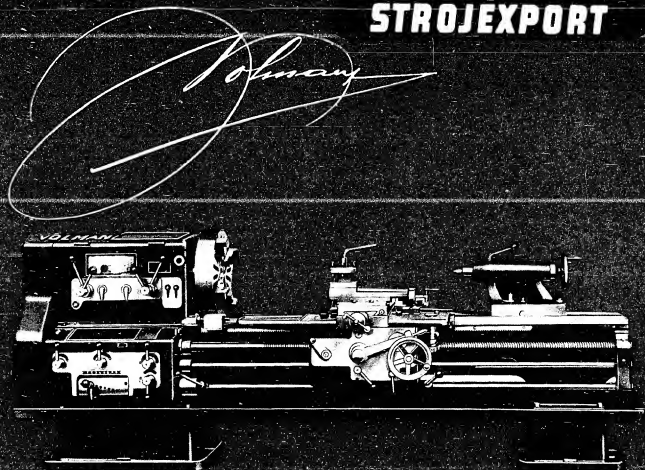
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STROJEXPORT



CENTRE LATHE
Type

L 27

Outstanding Features

- ★ Wide range of spindle speeds.
- ★ Possibility of cutting metric, Whitworth, module and diametral pitch threads.
- ★ Possibility of cutting steep threads.
- ★ Accurate disengagement of longitudinal feed of carriage.
- ★ Bed gap with removable bridge.

The machine is intended for all current turning operations and can be used to advantage for individual manufacture as well as for repetition work.

The design of the machine incorporates all basic features of a modern lathe. Precision manufacture and the use of high grade materials complete the technical perfection of the machine from the point of view of performance as well as precision and reliability in service.

L 27

Description

The headstock spindle runs in front in an adjustable plain bearing. The layshafts of the sliding gears have a six spline cross section and run in antifriction bearings.

The spindle is started by a reversing double multiplate clutch which is easy to adjust for various outputs. This clutch also protects the machine from overload. When the clutch is disengaged the spindle is stopped automatically by a brake connected with the multi-plate clutch. All rotating parts of the headstock run in an oil bath.

In the headstock 18 forward speeds of the spindle are arranged and 18 increased reverse speeds. These speeds can be further increased by using a two-speed motor which is supplied on request.

While a speed is engaged only the gears which transmit power are in mesh.

The headstock also contains the gears necessary for cutting steep threads or for high rates of feed. These threads have a pitch four times or sixteen times as high as the pitch engaged in the quick-change gear box. In addition to that a reversing gear for cutting right and left hand threads is fitted in the headstock.

All gears in the headstock are made of hardened and tempered steel and the teeth are shaped on precision machines. The machine can, if required, be supplied with the gears hardened and ground which are particularly recommended for the machine with the increased range of spindle speeds.

The quick change gear box is of the universal type and permits all current metric, module, Whitworth and DP threads to be cut. The machine is normally supplied with a lead screw with inch pitch. This design proves especially suitable as not only threads with extremely coarse pitch can be cut but it allows also the change gears to be in direct contact with the lead screw when cutting abnormal threads.

The quick-change gear box has its own central lubricating system. The apron box is fitted with an arrangement which permits the longitudinal feed to be disengaged with high precision by positive stops.

A valuable supplement of the arrangement for disengagement by positive stops is the stop drum which permits automatic turning against positive stops in either direction. The drum has four slots and permits several stops to be set in one slot behind each other or, if necessary, slip gauges to be used.

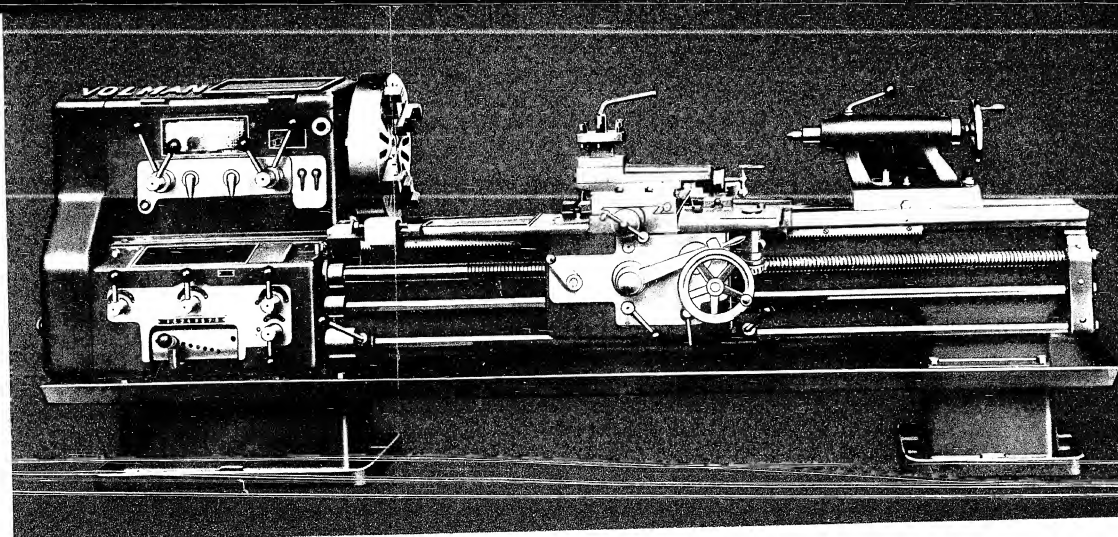
The feeds are engaged in steps by a friction clutch. The longitudinal and cross feeds are reversed by means of a reversing gear controlled by a lever. The prevention of simultaneous engagement of the clasp nut and feeds is ensured by mutual interlocking.

The carriages are of generous dimensions and the wide guideways are accurately scraped.

The swivelling cross slide has an angular scale and carries the four-way tool post with catches for eight individual positions.

The lower, sliding part of the cross slide can, on request, be extended and fitted with a rear tool post.

The machine is driven by a standard feet mounted electric motor fitted at the rear of the bed on a universal base. The mounting rails, which can be moved crosswise, permit a motor of different origin to be fitted as well. The machine is driven from the motor by means of V-belts.



Standard Equipment (included in price of machine)

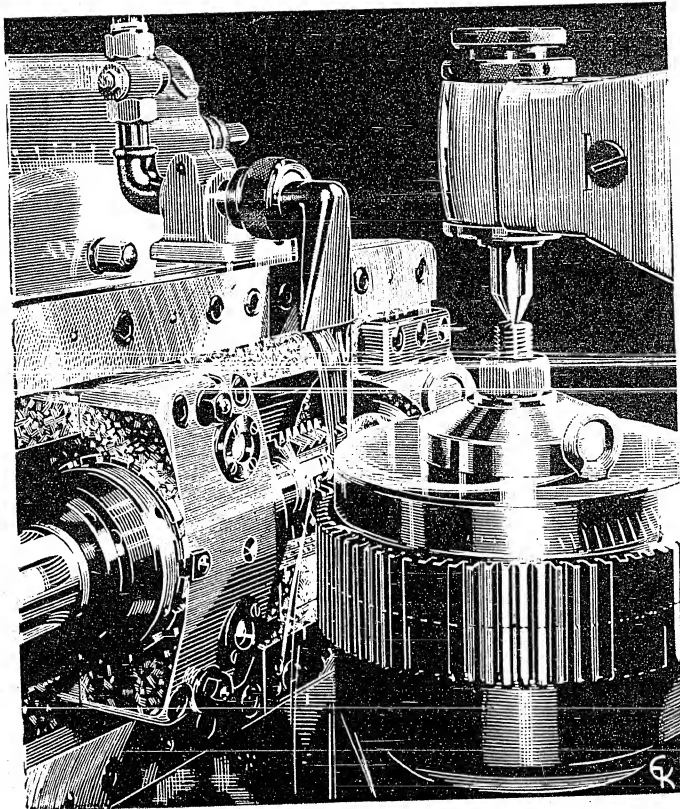
- 1 self-centering chuck with 4 reversible jaws
- 1 driver plate
- 1 steady and 1 follow rest
- 1 thread indicator
- 1 cooling equipment with pump
- 1 chip pan
- 1 four-way tool post
- 2 dead centers with reducing sleeve for spindle head
- 1 flange for fitting of universal scroll chuck
- 1 three-phase electric motor, 380 Volts, 50 cycles, 1400 r. p. m., 7.5 HP with base and mounting rails including V-belt pulley and V-belts, guard and cam-type switch
- 1 set of change gears
- indicating plates
- 1 operating instructions

Optional Equipment and Design (supplied against extra charge)

- Length stop drum
- Extended cross slide with rear tool post
- Taper bar
- Design of headstock with all gears hardened and ground
- Two-speed electric motor 1400/2800 r. p. m. with cam-type switch instead of standard motor (only when all gears are ordered hardened and ground)
- Single-pulley drive with plain pulley (price of motor will be deducted)

STAT

MACHINE TOOLS



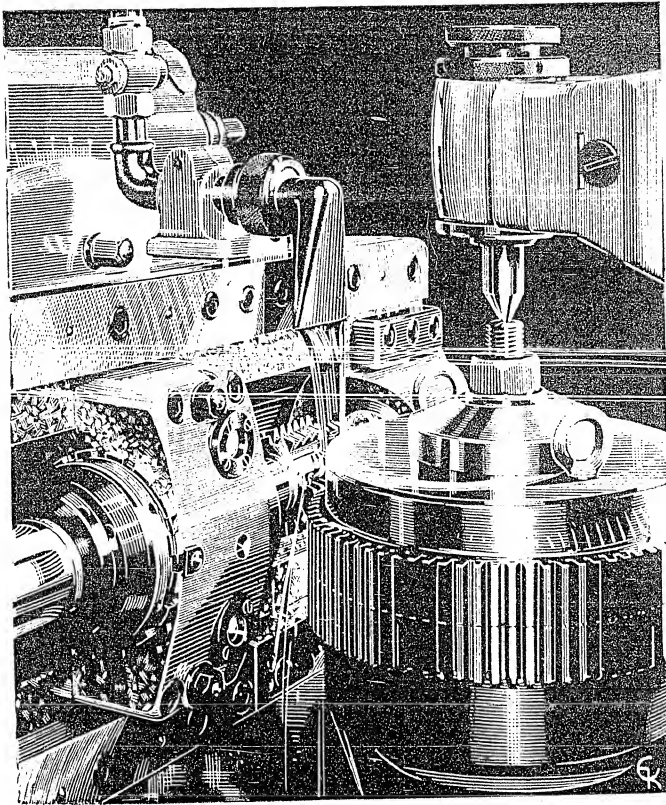
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MACHINE TOOLS

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CONTENTS

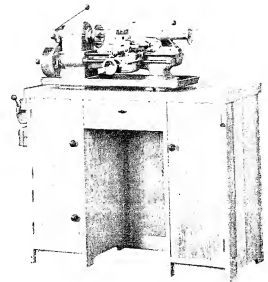
Kind of machine	Type	Page	Kind of machine	Type	Page
Lathes	MN 80	3	Milling Machines	FA3H	26
	JSO 5	3		FA3V	26
	S 28	4		FA3U	26
	SR 200	4		FA4H	27
	L 27	5		FA4V	27
	C 45	5		FA4U	27
	SV 18 R	6		FA5H	28
	SN 20	6		FA5V	28
	SU 35	7		FA5U	28
	SU 50	7		FH2a	29
	SU 63	7		PV2a	29
	SU 80	7		FU2a	29
	SUR 240	8	Double housing milling machines	FP 12	30
	SUR 300	8		FP 16	30
	SUR 350	8		FP 20	30
	SUR 400	8	Die-sinking machines	FK 08a	31
	SR 1000	8		FK 08b	31
	SR 1250	8		FK 08c	31
	S 1600	9	Gear hobbing machines	FO 6	32
	S 2100	9		FO 10	32
	S 2500	9		OF 16	32
	S 3150	9		OF 25	32
Capstan lathes	R 12	10	Gear cutting machines	OKU 35	33
	R 5	10	Shaping machines	HO 20	34
Turret lathes	RT 26	11		HM 45	34
	RT 34	11		HO 63	34
	RT 80	11	Slotting machines	HOV 16	35
	RN 36	12		HOV 25	35
	RN 60	12		HOV 45	35
Automatic turret lathes	A 12	13		HOV 63	35
	A 20	13		ST 350	35
	A 40	13	Gear shapers	OH 4	36
Vertical lathes	SK 12	14		OH 6	36
	SK 25	14	Planing machines	HD 12	37
	SK 40	15		HD 16	37
	SK 50	15		HD 25	38
Drills	V 16	16		HD 31	38
	V 20	16		H 85	39
	V5 16	16		HO 12	39
	V5 20	16	Universal grinding machines	1 U	40
	V5 32	16		2 U	40
	VK 32	17		5 U	40
	V 40	17		7 U	40
	V 50	17		BUA 20	41
Radial drilling machines	VR 2	18		BK 3	41
	VR 4	18		BK 5	41
	VR 6	18	Crankshaft grinding machines	4 C	42
	VR 8	19		7 CD	42
	VR 10	19	Surface grinding machines	BPH 20	43
Screwcutting machines	ZV 1040	20		BPH 300	43
	PV 5	20		BPH 300	44
Horizontal boring machines	H 63	21		BPV 700	44
	H 80	21	Tool grinding machines	BL 3	45
	H 100	21		BL 4	45
	HVF 160 S	22		BBT 350	45
	HVF 125 D	23		BN 400	45
	HVF 160 D	23		BN 102	46
	HVF 200 D	23		BNV 75	46
Milling Machines	FU	24		BNO	46
	FIS	24	Centerless grinding machines	BBZ 60	47
	FU2	24		4 B	47
	FA2H	25	Metal sawing machines	PR 20	48
	FA2V	25		PR 30	48
	FA2U	25		P 27	48
				H 350	48

LATHES

CENTER LATHE Model MN 80

Precision Center Lathe for machining parts of all kinds of metals and plastics, especially well-suited for the fine mechanical industry. It is arranged for cutting metric threads with a pitch of 0.2—6 mm. The machine is supplied with a wooden bench containing the main drive motor with back gears. Special equipment: half centre, hollow centre, catch trident for wood turning, swing-down hand rest, indexing attachment for the workspindle, rise and fall rest, indexing attachment for the cross slide rest, double tool drilling head, as well as various chucking tools described in a special catalogue.

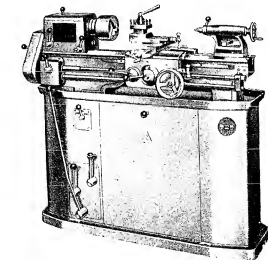
Type	MN 80
Swing over bed	mm 160
Distance between centres	mm 280
Swing over carriage	mm 90
Bore of spindle	mm 18
6 spindle speeds, ranging from	r.p.m. 150—1500
20 rates of longitudinal feed	mm rev. 0.01—0.15
20 metric threads, pitch	mm 0.2—3
HP of motor	0.35
Floor space required	mm 500x1150
Weight of machine with standard equipment	kg 135



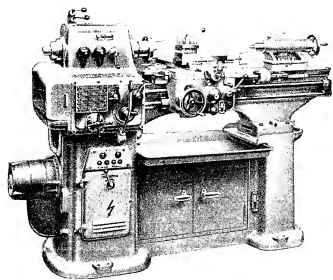
CENTER LATHE Model JSO 5

This machine is intended for the precision machining of smaller parts. The carefully made box-type construction and the built-in powerful electric motor ensure an exceedingly high capacity of the machine. The lathe is arranged also for cutting Metric, Whitworth, Module and Diametral Pitch threads.

Type	JSO 5
Swing over bed	mm 225
Swing over carriage	mm 135
Distance between centres	mm 600
Bore of spindle	mm 25.5
Spindle speeds: Number	10
Range: Standard Range (motor n = 1000 r.p.m.)	r.p.m. 36—2100
High range (on special order motor n = 1500 r.p.m.)	r.p.m. 57—3000
Feeds: Range of longitudinal feeds	mm rev. 0.017—1.27
Range of cross feeds	mm rev. 0.009—0.7
Threads: 24 metric threads, pitch	mm 0.25—6
24 Whitworth threads, pitch	mm 4—72
14 module threads, module	mm 0.25—3.5
Output of motor	kW 0.75 or 1.1
Floor space required	mm 650x1350
Weight of machine with standard equipment	kg 440



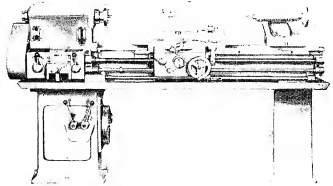
LATHES



CENTER LATHE Type S 28

A machine for precision manufacture. While permitting various turning operations to be carried out it affords an economical utilization of cemented carbide tipped tools. In order to achieve a particularly high degree of rigidity of the machine the headstock, headstock gear box and quick change gear box are designed as a single unit in the shape of a housing to which the bed is attached by means of a flange. Metric, Whitworth and Module threads can be cut on the machine.

Type	S 28	Type	S 28
Swing over bed	280	Threads: 36 metric threads with pitches ranging from	mm 0.375 to 44
Distance between centers	750	36 Module threads with modules ranging from	mm 0.375 to 44
Swing over carriage	150	36 Whitworth threads ranging from	t.p.i. 3 4 to 88
Swing over bed gap	370	Power of motor	HP 4
Bore of spindle	36	Floor space required by machine (width x length)	mm 910 2140
Spindle speeds: 3 ranges of spindle speeds each having 18 steps ranging from	r.p.m. 20 to 1000	Weight of machine with standard equipment	kg 1080
To special order	r.p.m. 63 to 3150		
Feeds: 36 rates of longitudinal feed ranging from	mm per rev. 0.03 to 3.52		
36 rates of cross feed ranging from	mm 0.01 to 1.22		



CENTER LATHE Type SR 200

A machine for current lathe work in small scale production and small workshops. Permits all current metric and Whitworth threads to be cut. Provided with a removable bridge.

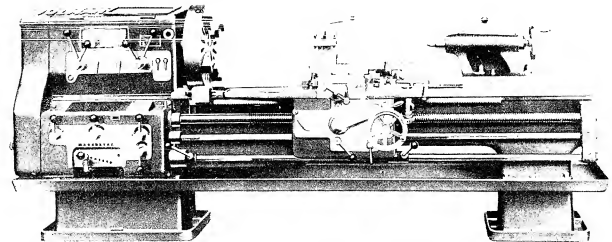
Type	SR 200	Type	SR 200
Swing over bed	390	Distance between centers	mm 1000 1500
Distance between centers	mm 240	Swing over carriage	mm 30 to 750
Swing over carriage	mm 240	8 spindle speeds ranging from	r.p.m. 0.06 to 0.92
32 rates of longitudinal feed ranging from	mm per rev. 0.02 to 0.31	32 rates of cross feed ranging from	mm per rev. 0.02 to 0.31
Power of motor	HP 2	Floor space required by machine	mm 880 2070 880 2570
Floor space required by machine	mm 880 2070 880 2570	Weight of machine with standard equipment	kg 785 845

LATHES

CENTER LATHE Type L 27

The machine is intended for all common turning operations and is used to advantage for individual manufacture as well as for repetition work. Metric, Whitworth, Module and Diametral Pitch threads can be cut on the machine in a wide range. The design of the machine incorporates all the fundamental features of a modern lathe. Precision manufacture and the selection of high grade material supplement the technical perfection of the machine from the point of view of performance as well as precision and reliability in operation.

Type	L 27	Type	L 27
Swing over bed	275	Rates of longitudinal feed ranging from	mm per rev. 0.03 to 8.3
Swing in bed gap	425	Threads which can be cut:	
Swing over carriage	175	55 metric threads	mm 1 to 224
Turning length	2000 3000	72 Whitworth threads	t.p.i. 1 to 30
Standard range of spindle speeds	r.p.m. 9.5 to 480	46 Module threads	module 0.25 to 56
Increased rate of spindle speeds, provided a 1400 2800 r.p.m. motor is supplied and all headstock gears are hardened and ground	r.p.m. 9.5 to 1000	58 Diametral Pitch threads	DP 0.5 to 120
		Power of 1400 r.p.m. motor	HP 7.5
		Weight of machine with standard equipment	kg 2800 2980



CENTER LATHE Type C 45

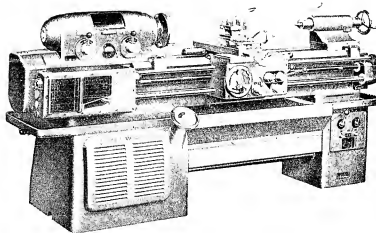
A production machine for current lathe work intended for smaller works and workshops. Designed for cutting metric, Whitworth, Module and Diametral Pitch threads. Supplied in lengths of 1500 or 2000 mm (59" or 78 1/2") between centers.

Type	C 45	Type	C 45
Swing over bed	450	48 rates of longitudinal feeds ranging from	mm per rev. 0.037 to 3.45
Distance between centers	mm 1500 2000	Power of motor	HP 4
Swing over carriage	mm 290	Floor space required by machine	mm 1000 2950
Bore of spindle	mm 51	Weight of machine with standard equipment	kg 1250 1350
8 Spindle speeds ranging from	r.p.m. 18 to 450		

LATHES

UNIVERSAL LATHE
Model SV 18 R

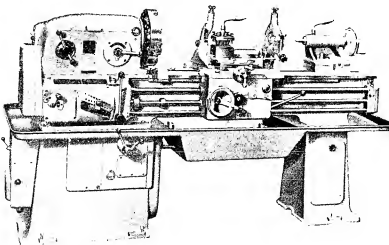
The machine meets all requirements for high dimensional accuracy and smooth finish of the machined parts. Its wide spindle speed and feed range permits economical machining of all classes of material in short run jobs as well as in the mass production. The lathe is arranged for cutting Metric, Whitworth, Module and Diametral Pitch threads. With the machine the following special equipment may be supplied: taper turning attachment, thread indicator, and various chucking tools described in a special catalogue.



Type		SV 18 R			
Swing over bed	-	-	mm	380	
Distance between centres	-	-	mm	750 1000 1250	
Swing over carriage	-	-	mm	215	
Spindle bore	-	-	mm	42	
21 spindle speeds, ranging from	-	-	r. p. m.	14—2800	
Range of longitudinal feeds	-	-	mm Rev.	0.02—5.6	
H. P. of motor	-	-	HP		
Floor space required	-	-	mm	2520 2720 3020 950	
Weight of machine with standard equipment	-	-	kg	1700 1750 1850	

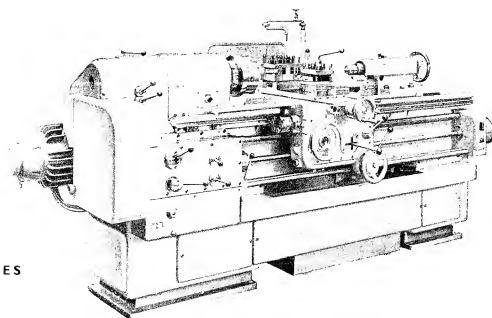
UNIVERSAL LATHE
Model SN 20

High Precision Machine suitable for all common turning operations. It is distinguished for high dimensional accuracy and first class finish of the machined components produced in short run jobs as well as in the mass production. Metric, Whitworth and Module threads can be cut on this machine. The taper turning attachment and various tools supplied as optional equipment are described in a special catalogue.



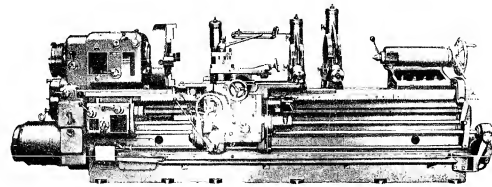
Type		SN 20			
Swing over bed	-	-	mm	400	
Distance between centers	-	-	mm	1000 1500	
Swing over carriage	-	-	mm	240	
Spindle bore	-	-	mm	40	
8 spindle speeds, ranging from	-	-	r. p. m.	32—1000	
27 rates of longitudinal feed, ranging from	-	-	mm Rev.	0.08—0.64	
H. P. of motor	-	-	HP		
Floor space required	-	-	mm	2320 1015 2820 1015	
Weight of machine with standard equipment	-	-	kg	1260 1360	

LATHES

CENTER LATHES
Types SU 35
and SU 50

are machines intended for economical individual manufacture of accurate machinery parts. They permit metric, Whitworth and Module threads to be cut in a wide range. The dust drive of the spindle permits high speeds to be used while the peripheral velocity of the gears is low. The use of a system of two driving motors permits frequent starting, stopping and reversing of the main spindle without the use of multi-plate clutches. The rapid traverses of the type SU 50 machine are driven by a separate electric motor.

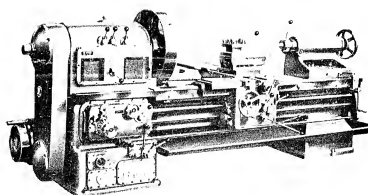
A taper turning attachment and various chucks as listed in separate prospectuses are available for the machine as optional equipment.

CENTER
LATHES
Types SU 63
and SU 80

Accurate heavy duty machines for heavy lathe work. They are used to particular advantage for non-uniform individual manufacture. The longitudinal and cross feeds can be limited by automatic disengaging boxes with an accuracy of $\frac{1}{100}$ mm. Metric, Whitworth, Module and Diametral Pitch threads can be cut on the machines. Numerous attachments available as optional equipment and listed in a separate prospectus increase the universal applicability of the machines to all turning operations.

Type		SU 35 SU 50 SU 63 SU 80			
Swing over bed	-	-	mm	355 500 630 800	
Distance between centers	-	-	mm	750 to 1500 750 to 2000 1250 to 8000 2000 to 8000	
Bore of spindle	-	-	mm	42 56 60 70	
Range of feeds	-	-	mm per rev.	0.04 to 11 0.0027 to 3.8 0.062 to 6 0.0067 to 24	
Spindle speeds: number	-	-		21 22 5x24 5x24	
range from	-	-	r. p. m.	28 to 2800 11.2 to 1400 8 to 1180 6.7 to 1000	
Power of 2 main motors	-	-	HP	11 15 23 13.5	
Power of main motor	-	-	HP	— — 23 13.5	

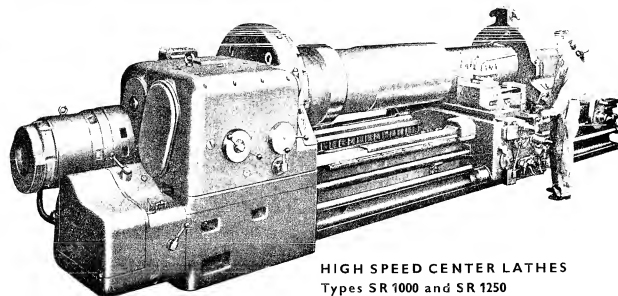
LATHES



CENTER LATHES type SUR

are heavy duty machines which permit, thanks to their rigidity, range and steps of spindle speeds and exceptionally high power of motor, economical machining with cemented carbide tipped tools. Metric, Whitworth, Module, Diametral and Circular Pitch threads within a wide range and with a large number of pitches can be cut on these machines. The numerous attachments available as optional equipment increase the versatility of the machines.

Type	SUR 240	SUR 300	SUR 310	SUR 100
Swing over bed	550	630	700	810
Minimum turning length	0 to 1000	0 to 1000	0 to 1000	0 to 1000
Spindle bore	40	40	50	50
Spindle speeds: number	32	32	32	32
range	0.8 to 1250	0.8 to 1100	0.8 to 950	0.8 to 810
Longitudinal feeds: number	88	88	88	88
range	0.01 to 2.5	0.01 to 2.5	0.01 to 2.5	0.01 to 2.5
110 metric threads, pitch	0.2 to 120	0.2 to 120	0.2 to 120	0.2 to 120
99 Whitworth threads	1/16 to 120	1/16 to 120	1/16 to 120	1/16 to 120
88 Module threads, pitch	0.125 to 30	0.125 to 30	0.125 to 30	0.125 to 30
Power of main motor	10	8.22	8.22	8.22

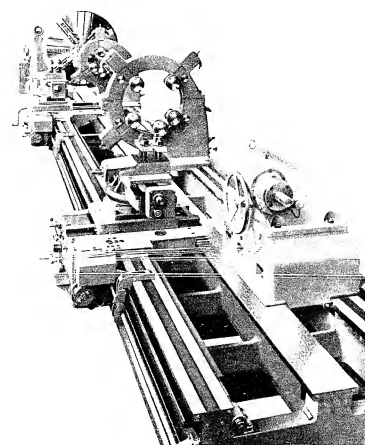
HIGH SPEED CENTER LATHES
Types SR 1000 and SR 1250

These machines are designed for a regular utilization of cemented carbide tipped tools and are marked by a wide range of main spindle speeds, a high rigidity and simple operation. The spindle is driven by a squirrel cage induction motor. Each carriage has its own mechanism for changing the rate, direction and sense of feed and is equipped with a rapid traverse. Common metric, Whitworth and Module as well as Diametral Pitch and Circular Pitch threads can be cut on these machines.

Type	SR 1000	SR 1250
Swing over bed	1000	1250
Distance between centers	3 to 12	3 to 12
Maximum weight of workpiece between centers without rest	9 to 10	13 to 14
35 spindle speeds: range I	1.8 to 90	1.8 to 90
range II	8 to 400	6.3 to 315
36 rates of longitudinal feeds ranging from	0.125 to 48	0.125 to 48
Power of main motor	46	46
Weight of machine with distance between centers of 3000 mm	13335	14900

LATHES

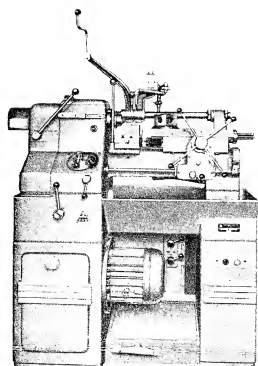
CENTER LATHES Types S 1600 D3, S 2100 D3, S 2500 D4 and S 3150 D4



These machines are intended for very heavy turning work. They are marked by a wide range of spindle speeds and feeds arranged in fine steps and can, therefore, be used to advantage for work with cemented carbide tipped tools as well as for work with wide tools and tools of special shape made of tool steel and high speed steel. The bed of the smaller types has three, of the larger types four guideways permitting the carriages to move past the rests and tailstock over their entire length of travel. The carriages are fitted with their own feed boxes and motors for rapid traverse. Each carriage can be equipped for screwcutting on its entire length.

Type	S 1600 D3	S 2100 D3	S 2500 D4	S 3150 D4
Swing over bed	1600	2080	2500	3150
Maximum weight of workpiece (without rest)	28000	28000	80000	200000
Maximum torque on face plate	7000	7000	25000	30000
24 spindle speeds ranging from	0.71 to 140	0.45 to 90	0.15 to 90	0.35 to 71
Longitudinal feeds ranging from	0.18 to 45	0.18 to 45	0.125 to 48	0.125 to 48
Output of main motor	76	76	156	156
Weight of machine with distance between centers of 6000 mm approx.	44500	48500	119500	185000

CAPSTAN LATHES

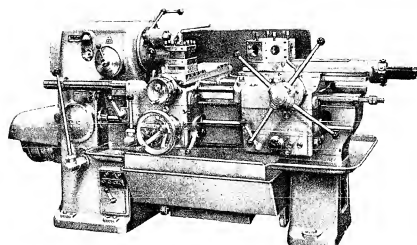


CAPSTAN LATHE Model R 12

Precision High Speed Lathe for the quantity production of small parts. It is built as a single purpose machine and may be easily converted to a manufacturing mechanical or finishing lathe by merely changing the individual units. The numerous attachments supplied both as standard and optional equipment are described in a special catalogue.

Type	R 12
Bar capacity - - - - -	mm 12
Spindle bore - - - - -	mm 25
Swing over bed - - - - -	mm 250
Maximum distance, turret to flange of main spindle - - - - -	mm 240
Number of tool holes - - - - -	6
Diameter of tool holes - - - - -	mm 25 H 6
Longitudinal travel of tool slide - - - - -	mm 100 145
Cross travel of slide rest - - - - -	mm 110
H. P. of motor - - - - -	2.8
Floor space required - - - - -	mm 1080 x 650
Weight of machine with standard equipment - - - - -	kg 560

CAPSTAN LATHE Model R 5



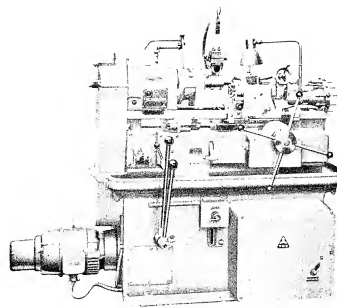
This Universal Machine has been designed for the series production of machine parts. It enables full utilization of high speed steel and hard alloy cutting tools. The preselection of spindle speeds and feeds reduces the non-productive times. The numerous attachments supplied as optional equipment are specified in a special catalogue.

Type	R 5	Type	R 5
Maximum swing over carriage - - - - -	mm 450	Travel of cross slide - - - - -	mm 250
Bar capacity - - - - -	mm 50	Number of power feeds - - - - -	12
Number of spindle speeds in both directions - - - - -	18	Range of longitudinal and cross feeds mm/rev. - - - - -	0.045-2
Range of spindle speeds - - - - - r.p.m.	28-1400	Number of turret feeds - - - - -	17
Longitudinal travel of carriage - - - - -	mm 660	Range of turret feeds - - - - - mm/rev. - - - - -	0.045-2
		Floor space required - - - - -	mm 3000 x 1400

TURRET LATHES

TURRET LATHES
Types RT 26 and RT 34

Precision high speed heavy duty machines intended for quantity production of parts with economical utilization of cemented carbide tipped tools. The numerous attachments supplied as optional equipment of these machines are described in a special prospectus.

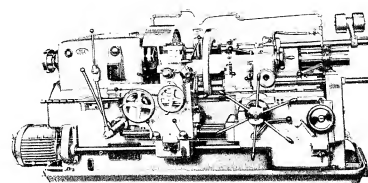


Type	RT 26	RT 34
Bar capacity - - - - -	mm 26	34
Spindle bore - - - - -	mm 28	36
Swing over bed - - - - -	mm 225	225
Distance, turret to flange of main spindle - - - - -	mm 440	435
Number of tool holes - - - - -	mm 12	12
Diameter of tool holes - - - - -	mm 15, 30, 35	15, 30, 35
Longitudinal travel of turret slide - - - - -	mm 440	435
Power of motor - - - - -	HP 3.5	5.5
Floor space required - - - - -	mm 850x1900	850x1900
Weight of machine with standard equipment - - - - -	kg 950	950

TURRET LATHE Type RT 80

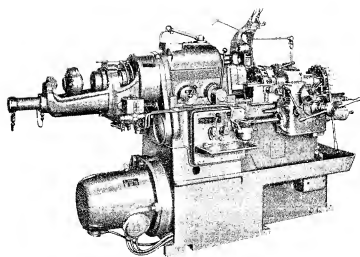
A precision heavy duty machine intended for quantity production of larger parts from bar stock as well as for individual manufacture with economical utilization of cemented carbide tipped tools. The numerous attachments and tools supplied as standard and optional equipment of this machine are described in a special prospectus.

Type	RT 80
Bar capacity - - - - -	mm 80
Spindle bore - - - - -	mm 82
Swing over bed - - - - -	mm 530
Distance, turret to flange of main spindle - - - - -	mm 900
Number of tool holes - - - - -	16
Diameter of tool holes - - - - -	mm 20, 40, 65
24 spindle speeds ranging from - - - - - r.p.m.	18 to 900
12 rates of longitudinal feed ranging from mm per rev. - - - - -	0.06 to 1.8
Power of motor - - - - -	HP 13
Floor space required - - - - -	mm 1160x3940
Weight of machine with standard equipment - - - - -	kg 4200

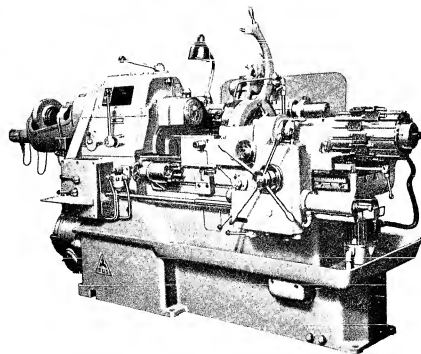


TURRET LATHES

TURRET LATHES Model RN 36 and RN 60



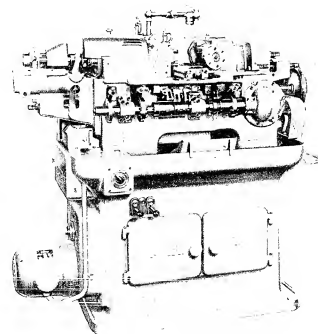
These lathes are destined for the economical machining of parts of steel, as well as of alloys of light and heavy non-ferrous metals. It enables full utilization of carbide tipped tools. The bars are fed and clamped automatically. The machines have the following outstanding features: wide range of spindle speeds with their high upper values, accurate automatic release of the turret cross feed, as well as high output of motor. The numerous optional equipments are specified in a special catalogue.



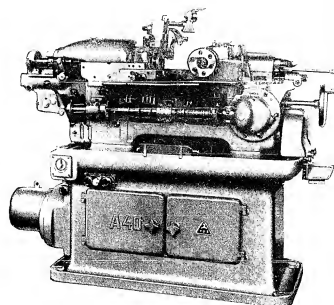
Type	RN 36	RN 60	Type	RN 36	RN 60
Maximum chucking diameter: for round bars - - - mm	34	58	6 longitudinal feeds, ranging from - - - - - mm/rev.	0.056—0.56	0.056-0.90
for other profiles (in scroll chuck) - - - - - mm	110—180	170—290	6 cross feeds, ranging from - - - - - mm/rev.	0.028—0.28	0.028-0.45
Maximum longitudinal travel of turret slide - - - - mm	410	610	Output of main motor - - - HP	12	21
50 spindle speeds, ranging from r.p.m.	56—3150	18—1600	Floor space required - - - mm	2550×950	3435×1150
			Weight of machines with standard equipments - - - kg	1300	2600

AUTOMATIC TURRET LATHES

AUTOMATIC LATHES Types A 12, A 20, A 40



High Duty Machines with enduring accuracy even at the most unfavourable working conditions. The wide spindle speed range on all three types enables the cutting of clean threads also in very hard materials, and economical utilization of the cutting speeds. The numerous attachments contribute greatly to the versatility of the machines. They may be ordered at each time and mounted on the machines without any previous adaptations.



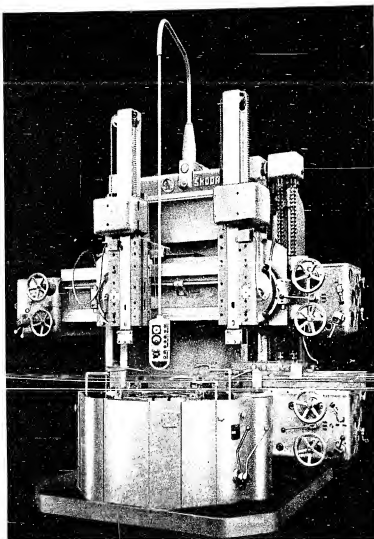
Type	A 12	A 20	A 40
Chuck capacity without outside bar feed - - - mm	12	20	40
Chuck capacity with outside bar feed - - - mm	16	26	66
Maximum bar feed length - mm	69	80	109
Maximum diameter of rounds cut in steel - - mm	12	14	28
Maximum diameter of threads cut in brass - - mm	16	18	36
Threads cut in brass - - mm	2.5—300	2.5—300	4—360
Number of spindle speeds for turning - - - - -	0	8	16
Range of spindle speeds for turning - - - - - r.p.m.	712—4574	522—3565	300—2000
Number of spindle speeds for thread cutting - - -	56	48	16
Range of spindle speeds for thread cutting - - - r.p.m.	48—2311	65—2013	75—510
Tool holes, dia. - - - - mm	20	20	25
Output of motor - - - - HP	3.5	3.5	5.5
Floor space required - - mm	1550×700	1550×700	1900×750
Weight of machine with standard equipment - - kg	1020	1100	1520

VERTICAL LATHES

VERTICAL LATHE
Type SK 12

This machine is intended for precision turning of machinery parts of larger diameters. It is normally equipped with a left hand tool arm with a slide on the cross rail including an equipment for automatic disengagement of feeds by adjustable stops, taper turning and screwcutting equipments.

The following items are available for the machine as optional equipment: Right hand tool arm with slide on cross rail, right hand tool arm with turret for five tools on cross rail, side arm, attachment for turning flat lepers and for copying by means of template for left hand tool arm on cross rail.



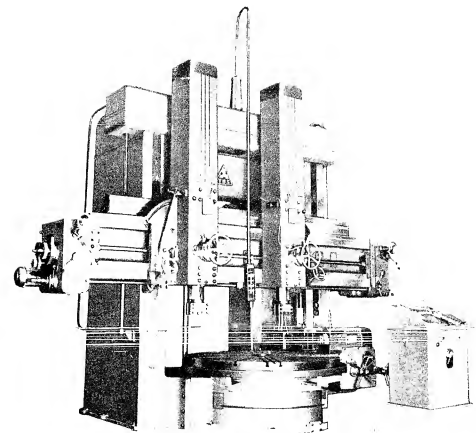
VERTICAL LATHE Type SK 25

A heavy duty machine permitting high tensile strength material to be machined and, if required, the machining to be done with three tool arms simultaneously. The machine is normally supplied with a right hand and a left hand tool arm with a slide on the cross rail and a side arm. It may, however, also be supplied with a tool arm with a turret head instead of the right hand tool arm with the slide on the cross rail.

Other additional equipment such as precision taper turning attachment and screwcutting attachment increase the versatility of the machine and are listed in the catalogue of the machine.

T Y P E	SK 12	SK 25
Maximum swing when turning with side arm	1250	2500
Maximum swing when turning with tool arm on cross rail	1350	2700
Vertical travel of cross rail tool arm slide	710	930
Horizontal travel of side arm slide	500	850
Diameter of table	1100	2250
Infinitely variable speeds arranged in four ranges ranging from	0.09 to 9	0.95 to 47.5
18 speeds of table ranging from		
Power of main motor	16 to 50	47
Weight of machine including two tool arms with slides on cross rail, approx.	15.800	50.185

VERTICAL LATHES



VERTICAL LATHES Types SK 40 and SK 50

These machines are intended for exceptionally heavy turning work on machinery parts of large dimensions and heavy weights. The machines are normally equipped with two tool arms on the cross rail. The following items are available for the machines as optional equipment: right hand side arm, taper turning attachment, screwcutting attachment, gears for fine feeds and other equipment listed in a special prospectus.

T Y P E	SK 40	SK 50
Maximum swing when turning with side arm	4000	5000
Maximum swing when turning with tool arm on cross rail	4200	5200
Vertical travel of cross rail tool arm slide	1400	1400
Horizontal travel of side arm slide	1250	1250
Diameter of table	3750	4750
Infinitely variable speeds arranged in three ranges ranging from	0.44 to 22.5	0.33 to 17.85
14 rates of feed ranging from	0.25 to 22.4	0.25 to 22.4
Power of motor of Ward-Leonard set, approx.	136	136
Constant output of driving motor with speed variable within range of 1:3.5, approx.	84	84
Approximate weight of machine with standard equipment	90.000	103.000

DRILLS

BENCH DRILLS Types V 16 and V 20

These machines are intended for simple drilling and boring operations in all commonly used kinds of material in individual manufacture as well as repetition work. The headstock has a rotary movement and is adjustable for height. The type V 20 drill has hand and power feeds of the spindle. The depth of drilling can be set on a millimetre scale.

Type	V 16	V 20
Drilling diameter - - - - - mm	16	20
Drilling depth - - - - - mm	125	160
Spindle bore - - - - - mm	17	17
Clamping surface - - - - - mm	280	355
Spindle speeds: number - - - - -	7	9
range - - - - - r.p.m.	355 to 2800	71 to 2800
Power of electric motor - - - - - HP	1.2	2.2
Weight of machine - - - - - kg	200	385

COLUMN DRILLS Types VS 16, VS 20, VS 32

These machines are used for drilling and reaming of all commonly used kinds of material in individual manufacture as well as repetition work. The machines can also be supplied as multi-spindle line drills assembled of individual headstocks attached to columns on a common table. Individual headstocks operate independently of each other but can all be stopped simultaneously.

Type	VS 16	VS 20	VS 32
Drilling diameter - - - - - mm	16	20	32
Drilling depth - - - - - mm	125	160	200
Spindle bore - - - - - mm	17	17	22
Working surface of table: horizontal - - - - - mm	280 x 350	280 x 350	316 x 400
vertical - - - - - mm	280 x 460	174 x 418	200 x 510
Distance, spindle to table - - - - - mm	640	640	650
Distance, centre-line of spindle to column - - - - - mm	250	250	280
Spindle speeds: number - - - - -	7	9	9
range - - - - - r.p.m.	355 to 2800	71 to 2800	36 to 2240
Power of electric motor - - - - - HP	1.2	2.2	3
Weight of machine - - - - - kg	380	390	635

DRILLS

COLUMN DRILL Type VK 32

This machine is intended for small shops where hand work predominates. It is used particularly in small smithies for drilling holes in metal tyres. The table is fitted with a rotary arm and fork for this work.

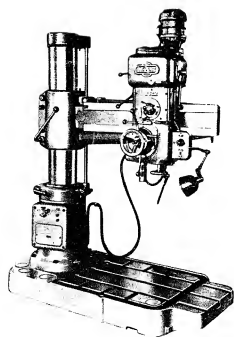
Type	VK 32
Drilling diameter - - - - - mm	32
Drilling depth - - - - - mm	125
Distance, spindle to table - - - - - mm	560
Distance, centre-line of spindle to column - - - - - mm	330
4 spindle speeds ranging from - - - - - r.p.m.	180 to 710
Power of electric motor - - - - - HP	1
Weight of machine - - - - - kg	280

UPRIGHT DRILLS Types V 40 and V 50

These machines are intended for the drilling of holes in medium size workpieces. The headstock is adjustable on the column for height. The working lead of the spindle is power driven. The feed of the spindle is disengaged automatically when the pre-set depth of drilling is used. The type V 50 machine has also a power operated movement of the headstock on the column. The simple bracket type table can be replaced by a compound table equipped for accurate setting of coordinates.

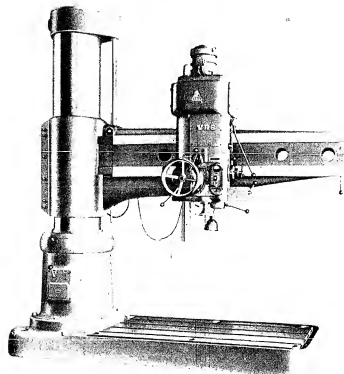
Type	V 40	V 50
Drilling diameter in steel - - - - - mm	40	50
Drilling depth - - - - - mm	240	265
Working surface of table - - - - - mm	450 x 450	500 x 500
Working surface of base plate - - - - - mm	540 x 660	560 x 740
Distance, spindle to table - - - - - mm	650	700
Distance, spindle to base plate - - - - - mm	1120	1160
Distance, centre-line of spindle to guideways of table - - - - - mm	375	420
Vertical travel of headstock - - - - - mm	300	350
12 spindle speeds ranging from - - - - - r.p.m.	48 to 950	37 to 760
Feeds: 4 ranging from - - - - - mm per rev.	0.12 to 0.80	
6 ranging from - - - - - mm per rev.		0.12 to 1.25
Power of electric motor - - - - - HP	3/4	4/5.5
Weight of machine - - - - - kg	1400	1850

RADIAL DRILLING MACHINES



RADIAL DRILLS Types VR 2, VR 4 and VR 6

Model	VR 2	VR 4	VR 6
Capacity:			
Maximum diameter when drilling steel 60 kgs per sq. mm tensile	mm 25	40	60
Maximum diameter when drilling cast iron 25 kgs per sq. mm tensile	mm 35	50	80
Maximum diameter when cutting fillets in steel 60 kgs per sq. mm tensile	mm 50	90	300
Maximum size of thread cut in steel 60 kgs. per sq. mm tensile	mm M 16	M 24	M 60
Maximum distance, column to centerline of spindle	mm 800	1255	2000
Max./min. distance, spindle to base	mm 1015/265	1300/260	1830/595
Output of drilling motor	HP 2	4	6.7/9.5
Weight of machine with standard equipment	kg 1250	2550	6400



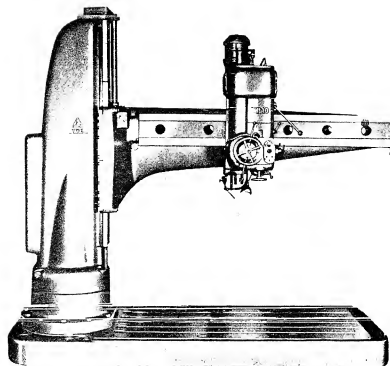
The machines are designed for the drilling and boring of holes, as well as for the cutting of threads in large and intricate machine parts.

Due to their very short setting-up times, these machines, when equipped with suitable jigs and fixtures, are superior to horizontal boring machines in many respects.

The drills are distinguished for their high efficiency, enduring accuracy, wide range of spindle speeds, and power feeds, raising of the arm by power, and the VR 4 machine for the preselection of spindle speeds.

RADIAL DRILLING MACHINES

RADIAL DRILLING MACHINES Types VR 8 and VR 10



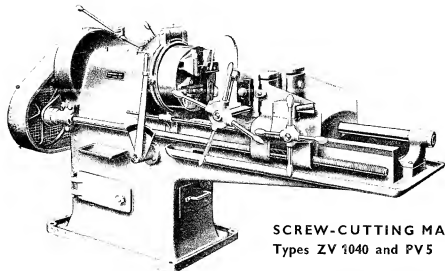
The machines are intended for the drilling and boring of holes as well as for the cutting of threads in large and intricate machinery parts. They are used to advantage for individual manufacture as well as for repetition work.

The arm rests on wide prismatic guideways on the base by this design an enduring higher accuracy and ease of setting up is obtained.

The machines are distinguished by a high output and a wide range of spindle speeds and power feeds.

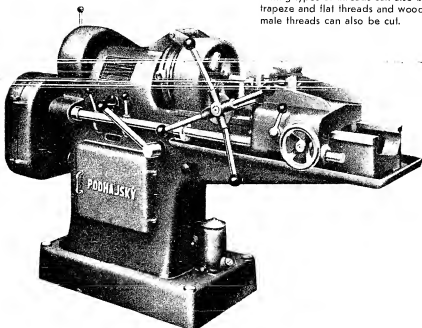
Type	VR 83	VR 84	VR 103	VR 104
Maximum diameter of drilling in steel with a tensile strength of 60 kg per sq. mm	mm 80	80	100	100
Maximum diameter of drilling in cast iron with a tensile strength of 25 kg per sq. mm	mm 110	110	125	125
Maximum size of thread cut in steel with a tensile strength of 60 kg per sq. mm	mm M 75	M 75	M 100	M 100
Maximum distance, guideway to extreme position of spindle	mm 3150	4000	3150	4000
Number of spindle speeds	12	12	12	12
Range of spindle speeds:				
standard	r.p.m. 11.2 to 1000	11.2 to 1000	11.2 to 1000	11.2 to 1000
high	r.p.m. 16 to 1400	16 to 1400	16 to 1400	16 to 1400
Power of drilling motor	HP 10/13.5	10/13.5	13/17.5	13/17.5
Weight of machine	kg 14000	16000	14500	16500

SCREW-CUTTING MACHINES



SCREW-CUTTING MACHINES
Types ZV 1040 and PV 5

Heavy duty precision machines intended for the cutting of threads in repetition work and mass production. Apart from standard threads the following types of threads can also be cut on the machine: left hand threads, trapeze and flat threads and wood screw threads. When taps are used female threads can also be cut.

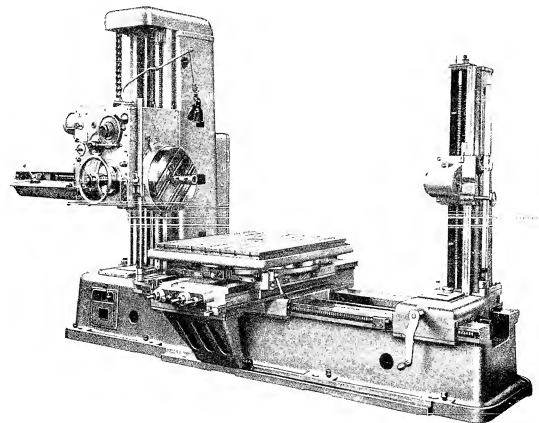


T Y P E		ZV 1040	PV 5
Range of threads cut: metric, diameter	mm	10 to 40	20 to 64
Whitworth, diameter	mm	3/8" to 1 1/2"	3/4" to 2 1/2"
pipe threads, diameter	mm	1/8" to 1 1/4"	1/2" to 2"
trapeze threads, diameter	mm	10 to 36	
round threads, diameter	mm	12 to 30	
Spindle bore	mm	55	68
Height of centre-line of spindle above bed	mm	125	175
Cutting length without re-clamping	mm	400	550
Spindle speeds: number		4	6
range	r.p.m.	42 to 156	23 to 105
Power of motor	HP	3	3
Floor space required by machine	mm	850x1800	925x2150
Weight of machine	kg	880	1250

HORIZONTAL BORING MACHINES

HORIZONTAL BORING MACHINES Types H 63, H 80 and H 100

The machines are intended for drilling, boring, milling, screw cutting, reaming and facing operations on various parts and are used to advantage wherever a high precision of dimensions and a superior grade of surface finish are required. The type H 80 and H 100 machines are equipped with an electric pre-selection of spindle speeds and feeds. Metric and Whitworth threads can be cut on all the machines. Attachments such as the taper boring attachment, adjustable boring attachment, single or double arm star facing head, telescopic tool-block, etc. supplied as optional equipment increase the versatility of the machine.



T Y P E		H 63	H 80	H 100
Diameter of main spindle	mm	63	80	100
Maximum diameter of boring by means of main spindle	mm	355	450	600
Maximum diameter of facing by means of face plate slide	mm	560	710	900
Maximum continuous/additional feed to spindle	mm	560/280	710/355	900/450
Maximum/minimum height of centre-line of spindle above table	mm	0-710	0-900	0-1120
Clamping surface of table	mm	710x900	900x1120	1120x1250
Cross power feed of table	mm	800	1000	1250
Longitudinal power feed of table when in transverse position	mm	900	1100	1400
Number of spindle speeds		16	18	27
32 rates of spindle feed per revolution ranging from	mm per rev.	0.02 to 12	0.02 to 12	0.02 to 12
32 rates of longitudinal and cross feeds of table per spindle revolution ranging from	mm per rev.	0.02 to 12	0.02 to 12	0.02 to 12
Power of motor	HP	5.5	7.5	10.2
Floor space required (widthxlength)	mm	2100x3900	2450x4950	2850x6050
Weight of machine with standard equipment	kg	4400	7600	11200

HORIZONTAL BORING MACHINES

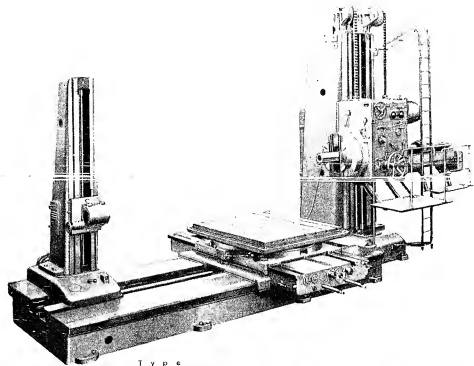
HORIZONTAL BORING MACHINE Type 160 S

The machine is intended for drilling, boring, reaming and milling operations and for the cutting of threads on large machinery parts, etc. It has a fixed column, a table with a longitudinal and cross movement and with a revolving clamping plate and a back rest with boring bar support which makes it particularly suitable for applications where boring operations predominate.

The machine is normally built as a right hand unit (i. e. with the column and head at the right hand side and the table at the left hand side).

The machine is marked by a high output, a wide range of spindle and face plate speeds, independent spindle and face plate drive, accurate setting of spindle, spindle head, table and boring bar support by means of precision scales with verniers or dial-type error gauges.

Metric and Whitworth threads of all commonly used sizes can be cut on the machine.

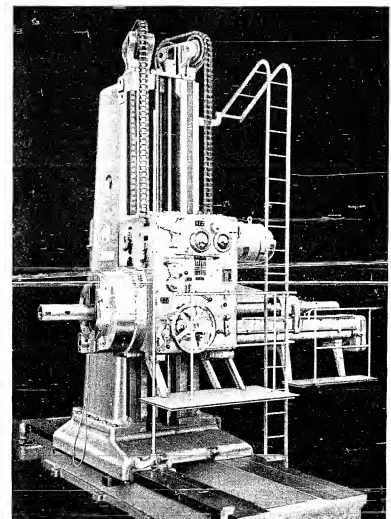


Type		HVF 160 S	
Diameter of spindle	mm	160	
Maximum torque: on spindle	kgcm	25000	
on face plate	kgcm	80000	
Maximum diameter of boring by means of spindle	mm	1000	
Maximum diameter of facing by means of face plate slide	mm	1300	
Maximum feed to spindle: continuous	mm	1200	
additional	mm	600	
Vertical movement of spindle head	mm	1900	
Height of centre-line of spindle above table	mm	0 to 1900	
Dimensions of clamping surface of table	mm	1600 x 1800	
Longitudinal travel of table	mm	2500	
Transverse travel of table	mm	2000	
24 spindle speeds ranging from	r.p.m.	2.25 to 450	
16 face plate speeds ranging from	r.p.m.	2.25 to 48	
16 rates of spindle feed ranging from	mm per rev.	0.04 to 8	
8 rates of table feed ranging from	mm per rev.	0.11 to 2.8	
22 metric threads with pitches ranging from	mm	0.5 to 12	
32 Whitworth threads ranging from	i.p.i.	28 to 1	
Power of main motor	HP	24	
Weight of machine with standard equipment	kg	35500	

HORIZONTAL BORING MACHINES

HORIZONTAL FLOOR PLATE TYPE BORING MACHINES Types HVF 125 D, HVF 160 D and HVF 200 D

Heavy duty machines intended for milling, drilling and boring operations on particularly large and heavy objects. Their outstanding features are a wide range of spindle speeds and a high power of the main motor. The type HVF 200 D machine is equipped, apart from the main spindle, with a second spindle with a particularly high speed. All common sizes of metric and Whitworth threads can be cut on these machines.



Type		HVF 125 D	HVF 160 D	HVF 200 D
Diameter of main spindle	mm	125	160	200
Maximum diameter of boring by means of main spindle	mm	850	1000	1700
Maximum diameter of facing	mm	1050	1300	
Total depth of boring with main spindle extended	mm	1525	1800	1800
Cross movement of housing on bed	mm	2500	3000	4000
Power of main motor	HP	16	24	33.5
Weight of machine with standard equipment (without floor plate)	kg	19500	26500	69000

MILLING MACHINES

MILLING MACHINES Type F1

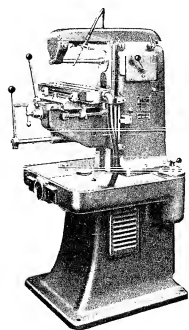
are built in the following three designs:

HORIZONTAL MILLING MACHINE - MODEL F1J

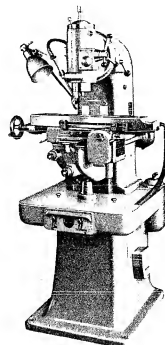
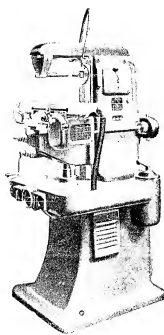
VERTICAL MILLING MACHINE - MODEL F1S

HORIZONTAL TWO-LEVER MILLING MACHINE - MODEL F1J2

The machines are intended for common milling operations on small machinery parts, individually manufactured as well as quantity produced. The high spindle speeds make possible economical milling of steels as well as of light metals. There is a choice of machines with various ranges of spindle speeds and various ranges of longitudinal power feeds to suit the prevailing kinds of work and material.



The spindle speeds are selected by a change-over switch or the number of poles of the three speed electric motor and by the lever of the gear box. The power feeds are changed by means of change gears. The two-lever design of the horizontal milling machine has only hand feeds, the longitudinal and vertical feeds being operated by levers, the cross feed by a hand wheel.



Type	F1J	F1J2	F1S
Clamping surface of table - - - mm	150 x 350	150 x 300	150 x 550
Taper in spindle: standard - - -	ISA 30	ISA 30	ISA 30
optional - - -	No. 2 Morse	No. 2 Morse	No. 2 Morse
6 spindle speeds, range to be selected by customer:			
range I - - - - - r.p.m.	190 to 1080	190 to 1080	190 to 1070
range II - - - - - r.p.m.	280 to 1530	280 to 1530	270 to 1540
range III - - - - - r.p.m.	380 to 2100	380 to 2100	380 to 2160
range IV - - - - - r.p.m.	—	—	540 to 3070
6 longitudinal power feeds, range to be selected by customer:			
range A - - - - - mm per min.	17 to 195	—	17 to 195
range B - - - - - mm per min.	24 to 275	—	24 to 175
Power of motor - - - - - HP	1.5/0.8/0.55	1.5/0.8/0.55	1.5/0.8/0.55
Weight of machine with standard equipment - kg	450	450	450

MILLING MACHINES

MILLING MACHINES Series FA2

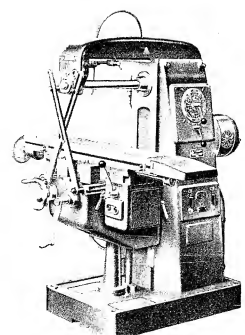
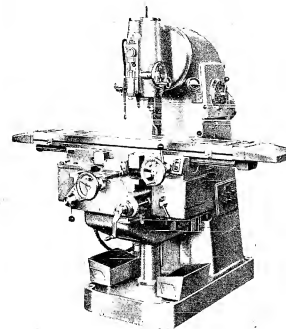
are built in three styles:

PLAIN MILLERS - MODEL FA2H

VERTICAL MILLERS - MODEL FA2V

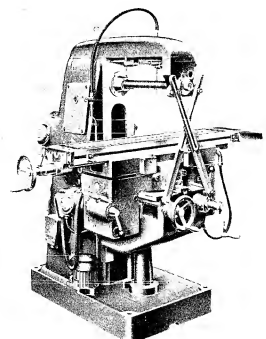
UNIVERSAL MILLERS - MODEL FA2U

They are designed for all common milling jobs and their main advantages are high efficiency and enduring accuracy. The wide spindle speed and feed range enables economical single piece as well as quantity production of machine parts. The numerous attachments and tools supplied as optional equipment and described in a special catalogue highly contribute to the versatility of the machines.



Individually driven longitudinal power feeds and rapid traverse are provided and may be accurately limited by adjustable stops. Accurate vertical adjustment of spindle on the FA2V machines is accomplished by slip gauges or by means of an indicator. A cutting speed calculator enables quick setting of the most convenient spindle speed.

Model	FA2H	FA2V	FA2U
Working surface of table - - - mm	200 x 1000	—	—
Taper in spindle: standard ISA - - -	40	—	—
on request Morse - - -	3	—	—
12 spindle speeds:			
standard series - - - - - r.p.m.	63—2800	—	—
high series - - - - - r.p.m.	90—4000	—	—
13 longitudinal feeds, ranging from - mm/min.	14—900	—	—
Longitudinal rapid traverse - mm/min.	2800	—	—
Output of main motor - - - - - HP	3.25	—	—
Output of feed motor - - - - - HP	0.7	—	—
Floor space required - - - - - mm	1385 x 1510	—	—
Weight of machine with standard equipment - kg	950	1000	950



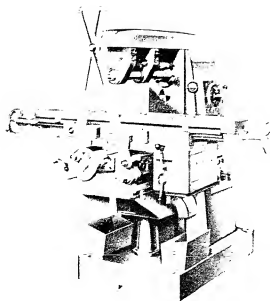
MILLING MACHINES

MILLING MACHINES Series FA 3

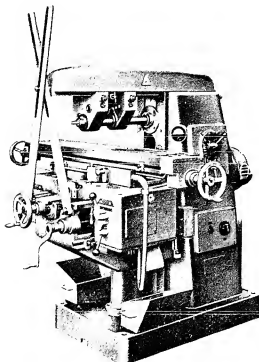
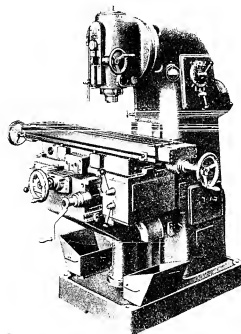
are built in three styles:

PLAIN MILLERS - MODEL FA 3 H
 VERTICAL MILLERS - MODEL FA 3 V
 UNIVERSAL MILLERS - MODEL FA 3 U

They are designed for all common jobs and their main advantages are high efficiency and enduring accuracy. The wide spindle speed and feed range enables economical single piece as well as quantity production of machine parts. The numerous attachments and tools, supplied as optional equipment and described in a special catalogue increase the versatility of the machines.



Individually driven power feeds and rapid traverses in all directions are provided and may be accurately limited by adjustable stops. Accurate vertical adjustment of spindle on the vertical machines is accomplished by slip gauges or by means of an indicator. A cutting speed calculator enables quick setting of the most convenient spindle speed.



Model		FA 3 H	FA 3 V	FA 3 U
Working surface of table	mm	250	1250	
Taper in spindle: standard ISA		40		
on request Morse		4		
12 spindle speeds: standard series	r.p.m.	45-2000		
high series	r.p.m.	63-2800		
13 longitudinal feeds, ranging from	mm/min.	14-900		
Longitudinal rapid traverse	mm/min.	2800		
Output of main motor	HP	5.7		
Output of feed motor	HP	1		
Floor space required	mm	1900	1800	
Weight of machine with standard equipment	kg	1500	1600	1550

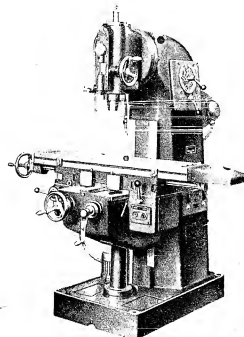
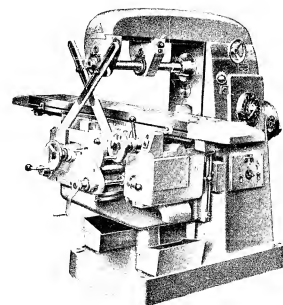
MILLING MACHINES

MILLING MACHINES Series FA 4

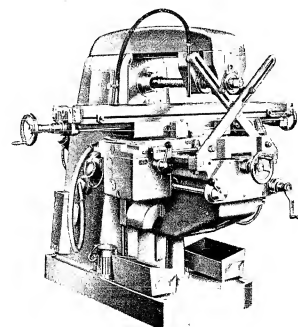
are built in three styles:

PLAIN MILLERS - MODEL FA 4 H
 VERTICAL MILLERS - MODEL FA 4 V
 UNIVERSAL MILLERS - MODEL FA 4 U

They are designed for all common jobs and their main advantages are high efficiency and enduring accuracy. The wide spindle speed and feed range enables economical single piece as well as quantity production of machine parts. The numerous attachments and tools supplied as optional equipment and described in a special catalogue increase the versatility of the machines.



Individually driven power feeds and rapid traverses in all directions are provided and may be accurately limited by adjustable stops. Accurate vertical adjustment of spindle on the vertical machines is accomplished by slip gauges or by means of an indicator. A cutting speed calculator enables quick setting of the most convenient spindle speed.



Model		FA 4 H	FA 4 V	FA 4 U
Working surface of table	mm	315	1600	
Taper in spindle: standard ISA		50		
on request Morse		5		
12 spindle speeds: standard series	r.p.m.	32-1400		
high series	r.p.m.	45-2000		
15 longitudinal feeds, ranging from	mm/min.	10-1250		
Longitudinal rapid traverse	mm/min.	3200		
Output of main motor	HP	7.5		
Output of feed motor	HP	1.5		
Floor space required	mm	1970	2350	
Weight of machine with standard equipment	kg	2500	2650	2600

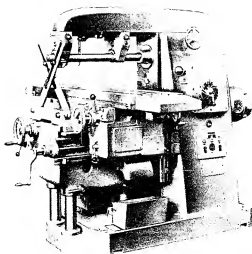
MILLING MACHINES

MILLING MACHINES Series FA 5

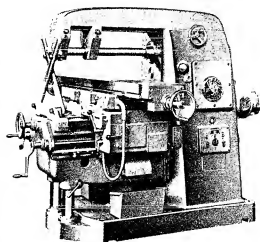
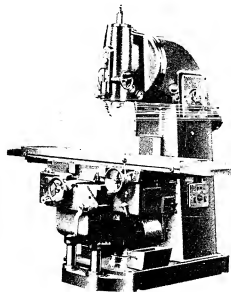
are built in three styles:

PLAIN MILLERS - MODEL FA 5 H
VERTICAL MILLERS - MODEL FA 5 V
UNIVERSAL MILLERS - MODEL FA 5 U

They are designed for all common milling jobs and their main advantages are high efficiency and enduring accuracy. The wide spindle speed and feed range enables economical single piece as well as quantity production of machine parts. The numerous attachments and tools supplied as optional equipment and described in a special catalogue increase the versatility of the machines.



The especially rigid construction of the column and knee is reinforced by cylindrical supports. Individually driven power feeds and rapid motions in all directions are provided and may be accurately limited by adjustable stops. Accurate vertical adjustment of spindle on the vertical machines is accomplished by slip gauges or by means of an indicator. A cutting speed calculator enables quick setting of the most convenient spindle speed.



Model		FA 5 H FA 5 V FA 5 U		
Working surface of table:	width	mm	425	425 400
	length	mm	2000	
Taper in spindle: standard ISA			50	
	on request Morse		5	
20 spindle speeds: standard series	r.p.m.		18—1400	
15 longitudinal feeds, ranging from	mm/min.		10—1250	
Longitudinal rapid traverse	mm/min.		3200	
Output of main motor	HP		15	
Output of feed motor	HP		3.25	
Floor space required			2550—2800	
Weight of machine with standard equipment	kg		4500 4700 4700	

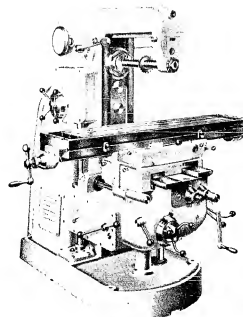
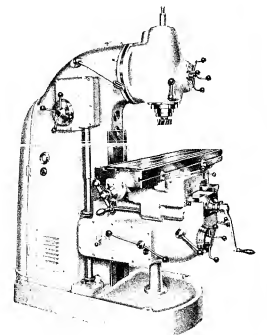
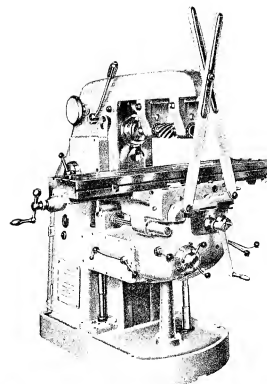
MILLING MACHINES

MILLING MACHINES Series F 2 a

are built in three styles

PLAIN MILLERS - MODEL FH 2 a
VERTICAL MILLERS - MODEL FV 2 a
UNIVERSAL MILLERS - MODEL FU 2 a

They are designed for all common milling jobs and their main advantages are high efficiency and enduring accuracy. Power feeds and rapid motions in all directions are provided. The numerous attachments and tools supplied as optional equipment and described in a special catalogue increase the versatility of the machines.

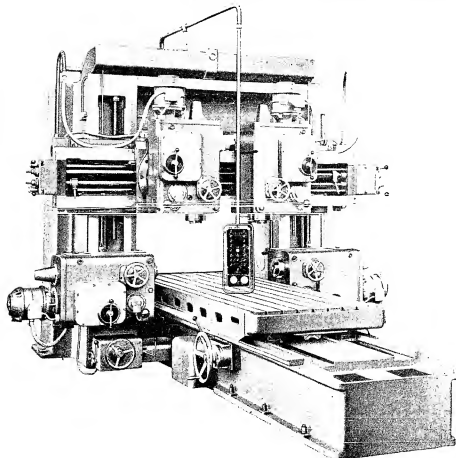


Model		FH 2 a FV 2 a FU 2 a		
Working surface of table:	width	mm	1350	300
	length	mm	50	
Taper in spindle: standard ISA			5	
	on request Morse		5	
16 spindle speeds: standard series	r.p.m.		31.5—1000	40—1250
	lower series	r.p.m.	20—630	25—800
2×12 longitudinal power feeds, ranging from	mm/min.		10—790	
Longitudinal rapid traverse	mm/min.		2085	
Motor output	HP		4.5	
Floor space required	mm		1850×2510	
Weight of machine with standard equipment	kg		1900 2040 1960	

DOUBLE HOUSING MILLING MACHINES

DOUBLE HOUSING MILLING MACHINES Types FP 12, FP 16 and FP 20

These heavy duty precision machines intended for the heaviest milling work, particularly on large machinery parts, make possible longitudinal and transverse milling of horizontal, vertical and slanting surfaces. The outstanding features of these machines are an exceptionally sturdy design of the housings, cross rail and table, a wide range of spindle speeds making possible milling with tools made of high speed steel as well as with cemented carbide tipped tools, infinitely variable table feeds, a particularly rapid traverse of the table, an accurate mechanical setting of the spindles to a pre-selected position by moving against a positive stop, automatic clamping of the cross rail and central control of individual movements of the machine centralized on a portable panel.



T y p e	FP 12	FP 16	FP 20
Clamping surface of table	mm 950×3000	1250×3500	1600×4000
Length of bed	mm 6000	7000	8000
Travel of table	mm 2750	3200	3700
Range of infinitely variable table feed	mm per min. 25 to 750	25 to 750	25 to 750
Rapid traverse of table	mm per min. 4000	4000	4000
Standard range of 19 ¹ / ₂ spindle speeds ranging from	r.p.m. 14 to 900	14 to 900	10 to 500
Clear width between housings	mm 1260	1660	2060
Distance, clamping surface of table to end of vertical spindle	mm 100 to 1260	100 to 1250	110 to 1400
Power of spindle motor	HP 12/17.5	12/17.5	21/30
Power of table feed motor (Leonard)	HP 1.3 to 20	1 to 20	1 to 20
Weight of machine (approx.)	kg 28000	39000	49000

¹) 16 spindle speeds in case of type FP 20

DIE-SINKING MACHINES

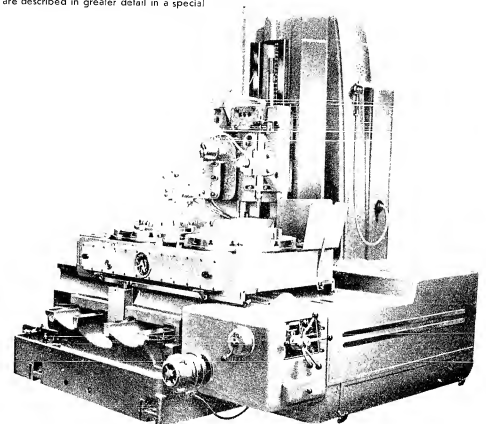
DIE-SINKING MACHINES Type FK 08

Machines for heavy duty precision milling of shapes in metals. Manufactured in the following three models:

FK 08a for die-sinking in coordinates and for contour die-sinking. FK 08b which has the same working facilities as the model FK 08a but on which objects can also be milled which are the mirror image of the pattern.

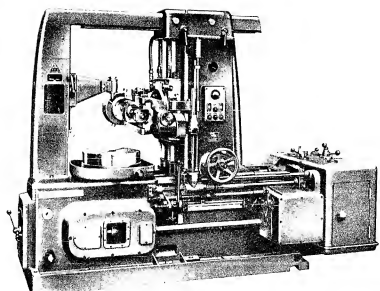
FK 08c which has the same working facilities as both above described machines but has, in addition, two revolving tables for circular die-sinking, to one of which the pattern is clamped, to the other the workpiece.

On all these machines either one object of larger size can be machined or two smaller objects, not wider than 250 mm, simultaneously by two tools. The working facilities are described in greater detail in a special catalogue.



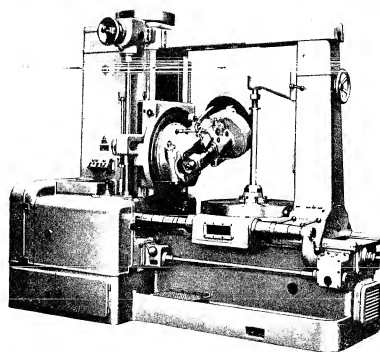
M o d e l	FK 08a	FK 08b	FK 08c
Working surface of table	mm 1450×700	1450×700	2100×700 dia.
The highest position of cutter above table	mm 1025	1025	950
Ranges of spindle speeds: standard range	r.p.m. 70 to 800	70 to 800	70 to 800
high range	r.p.m. 335 to 3600	335 to 3600	335 to 3600
Power of main motor	HP 4	4	4
Floor space required by machine	mm 2330×2530	2330×2530	2450×2650
Weight of machine with standard equipment	kg 7800	8200	9000

GEAR HOBBIING MACHINES



GEAR HOBBIING MACHINES
Types FO 6, OF 10, OF 16 and FO 25

These machines are intended for precision production of spur, helical and worm gears by hobbing. Worm wheels can also be hobbled by the tangential method the equipment for which may be ordered for the machine as optional equipment. The range of speeds and rates of feed makes the machine suitable for the machining of all currently used materials.

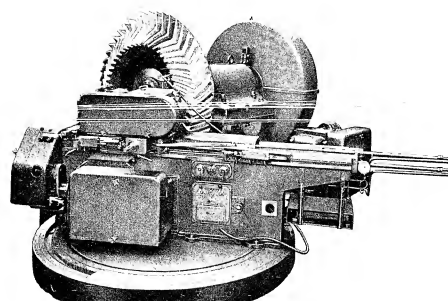


Type	FO 6	OF 10	OF 16	FO 25
Maximum module hobbled (maximum capacity) - - - - -	6	10	16	25
Maximum diameter of gear - - - - -	800	1000	1600	2500
Diameter of clamping table - - - - -	420	850	1350	1500
Range of spindle speeds - - - r.p.m.	15 to 190	20 to 125	16 to 80	12.5 to 63
Power of main motor - - - - -	4.5	10	15	19
Floor space required by machine - - - mm	2540 x 1400	3120 x 1840	4300 x 2000	4870 x 2640
Weight of machine with standard equipment - - - - -	4000	9000	19000	21000

GEAR CUTTING MACHINES

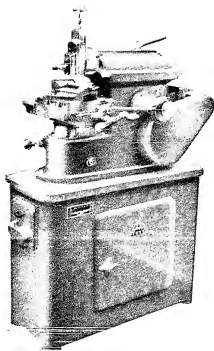
GEAR CUTTING MACHINE Type OKU 35

This machine is suitable for cutting straight, helical and herringbone teeth on both spur and bevel gears. It is particularly well suited for the cutting of herringbone gears because the gear remains undivided, without the centre gap. The gears are cut by means of simple and inexpensive shank type cutters with straight or helical cutting edges. The feed of the cutter into the cut, the rapid withdrawal of the cutter on completion of a tooth gap, the return of the headstock to its starting position and the rotation of the gear by another pitch are operated by an automatically controlled hydraulic equipment. All teeth having been cut the machine stops automatically.



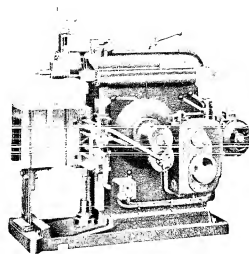
Type	OKU 35
Maximum diameter of spur gear being cut when clamped to front face of spindle - - - - -	mm 2250
Maximum width of rim of gear being cut - - - - -	mm 630
Minimum and maximum number of teeth of gear being cut - - -	13/400
Maximum module - - - - -	mm 35
Power of electric motor of headstock - - - - -	HP 15
Weight of machine with standard equipment - - - - -	kg 8900

SHAPING MACHINES



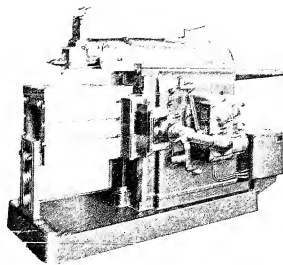
SHAPING MACHINE Type HO 20

This machine is intended for the machining of machine components, such as shafts, in 20, 25, 30, 40 mm. They are immovably supported on two rollers with cast wheels. They can be adjusted to machining of the machine's circular and cylindrical surfaces, which for the shape of a tool and require the feeding with the table.



SHAPING MACHINE Type HO 63

A heavy duty precision machine for the machining of horizontal, vertical and standing surfaces and slots in individual machine parts of medium and large machinery parts.



SHAPING MACHINE Type HO 63

A heavy duty precision machine for the machining of horizontal, vertical and standing surfaces and slots in machinery parts of individual machine parts. The machine has separate drives for the column and the table, each by independent electric motors.

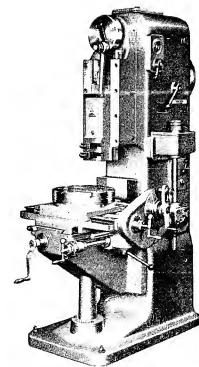
Parameter	HO 20	HO 25	HO 45
Maximum length of stroke	200	250	450
Diameter of clamping table	320	500	900
Cross travel of table	320	450	700
Longitudinal travel of table	200	560	900
Distance, tool edge to column	265	465	950
Number of up-and-down strokes per minute	71 to 180	22 to 112	11 to 56
Power of driving motor	2	6.1	15
Weight of machine	1050	2850	7100

SLOTTING MACHINES

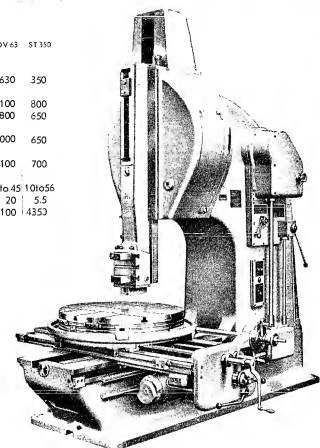
SLOTTING MACHINES

Types HOV 16, HOV 25, HOV 45, HOV 63 and ST 350

Heavy duty precision machines for machining plane and circular surfaces and internal slots of individually manufactured machinery parts. Accurate adjustment of the circular table is accomplished by means of a built-in hand operated dividing equipment. The longitudinal, transverse and circular movements of the table are operated by hand and by power.



Parameter	HOV 16	HOV 25	HOV 45	HOV 63	ST 350
Maximum length of stroke	160	250	450	630	350
Diameter of clamping table	320	500	900	1100	800
Cross travel of table	320	450	700	800	650
Longitudinal travel of table	200	560	900	1000	650
Distance, tool edge to column	265	465	950	1100	700
Number of up-and-down strokes per minute	71 to 180	22 to 112	11 to 56	7 to 45	10 to 56
Power of driving motor	2	6.1	15	20	5.5
Weight of machine	1050	2850	7100	9100	14350

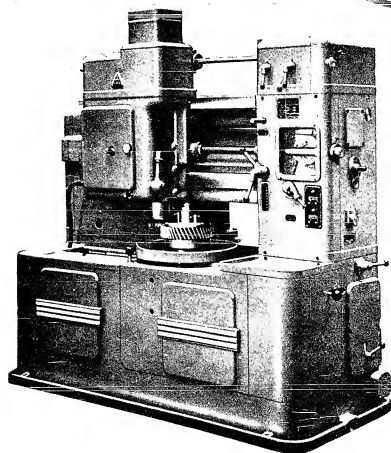
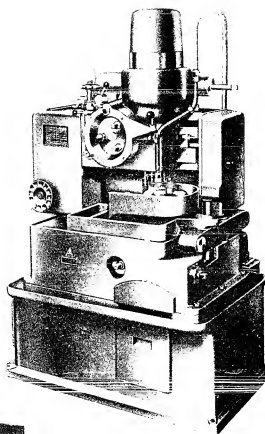


GEAR SHAPERS

GEAR SHAPERS Types OH 4 and OH 6

Heavy Duty Machines for cutting gears by the selfgenerating method, especially well-suited for the quantity production of accurate internal and external spur, helical and herringbone gears, gear segments, gear tooth type clutches, ratchets, cams, polygon and other shaped holes, etc. Ease of operation and quick setting of the machine enable an economical production also in short run and single part jobs.

Model	OH 4	OH 6
Maximum real module shaped	4	6
	exter. gears	inter. gears
Maximum diameter of spur gear - mm	200	165
Maximum diameter of helical gear - mm	195	162
Minimum diameter of gear - mm	10	36
Maximum face capacity of gear - mm	40	36
Range of tool strokes per minute	220—635	50—315
Output of motor - HP	1.2	0.75
Floor space required - mm	930x1200	1000x2100
Weight of machine with standard equipment - kg	1500	2500

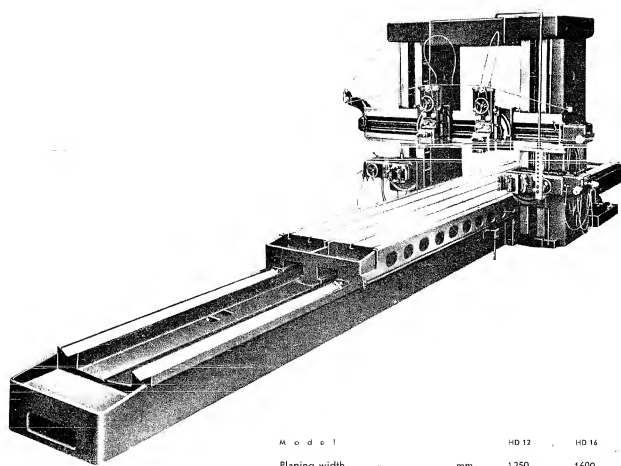


PLANING MACHINES

DOUBLE HOUSING PLANING MACHINES Types HD 12 and HD 16

High Speed Heavy Duty Machines of particularly rigid design which ensure a high grade of the machined surface even for the heaviest operations. Their high capacity allows cemented carbide tipped tools to be used, especially for the machining of cast iron. The main advantages of the machines are: wide range of infinitely variable cutting and return speeds, hydraulic infinitely variable feeds and rapid motions of rail heads, and tool lifting on all heads in any position of tool slide.

As optional equipment a left-hand sidehead with automatic tool lifter and hydraulic feed attachment, as well as a tool sharpening device can be supplied.

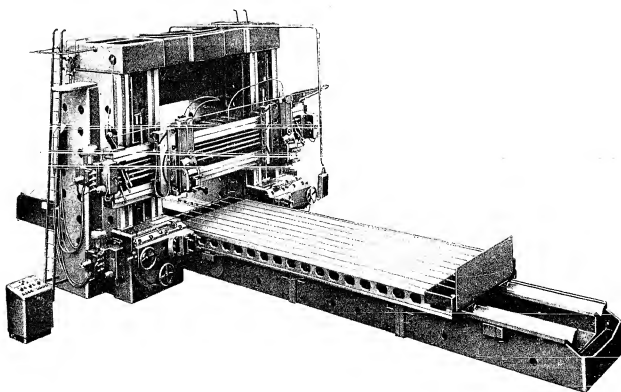


Model	HD 12	HD 16
Planing width - mm	1250	1600
Planing length - mm	3000—12000	4000—12000
Table speed in both directions -	Constant speed	Infinitely variable speed
model I. - m/min.	3	5—50
model II. - m/min.	3	6.3—63
model III. - m/min.	3	8—80
Input power of motor - HP	60	
Weight of machine with standard equipment: (at planing length 3000)	22000	
(at planing length 4000)		37000

PLANING MACHINES

PLANING MACHINES
Types HD 25 and HD 31.5

The machines satisfy the latest demands of production. Their outstanding features are great rigidity, remote control, high cutting and return speeds with infinitely variable control and an especially high drawing force. The driving power of the table is supplied by two Ward-Leonard motors. The locking of the cross rail on the housings is hydraulic. The tool arms have their own feed boxes for power feeds and rapid traverse.

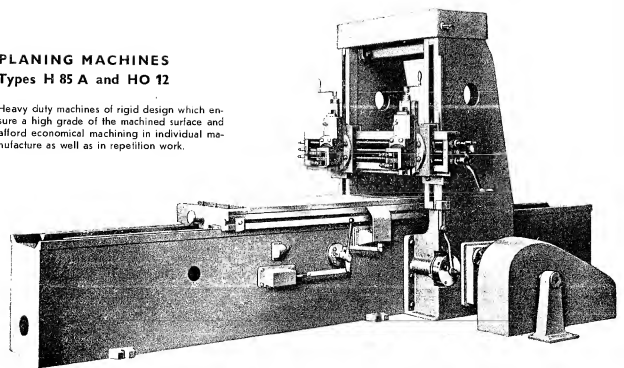


T y p e		HD 25	HD 31.5
Planing width	mm	2500	3150
Planing length	metres	4 to 12	6 to 10
Planing height	mm	2000	3150
Overall range of table speed	metres per min.	3.6 to 63	2 to 80
Drawing force on table up to	kg	13000	30000
Power of driving motors of table	HP	116	150
Weight of machine with 10 metres planing length, approx.	kg	140000	149000

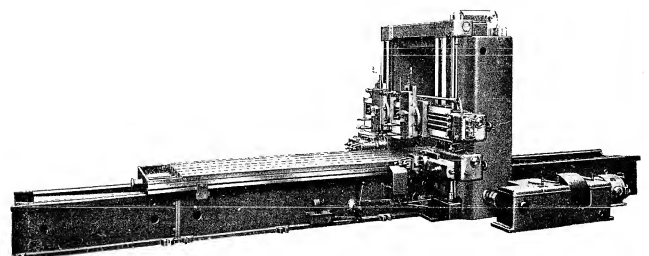
PLANING MACHINES

PLANING MACHINES
Types H 85 A and HO 12

Heavy duty machines of rigid design which ensure a high grade of the machined surface and afford economical machining in individual manufacture as well as in repetition work.



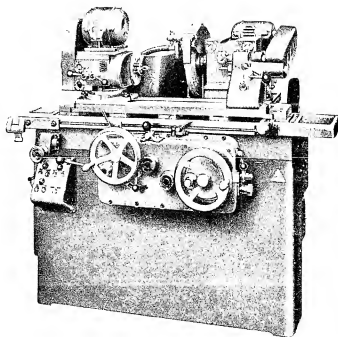
T y p e		H 85 A	HO 12
Planing width	mm	850	1250
Planing length	mm	2000	3000
Planing height	mm	780	1100
Clamping surface of table (width x length)	mm	685 x 2030	685 x 3030
Cutting speed	metres per min.	11—16—22	1050 x 3000 to 6000
Return speed	metres per min.	28	25
9 cutting speeds ranging from	metres per min.		5 to 28
6 return speeds ranging from	metres per min.		5 to 35
Speed of table for grinding in both directions	metres per min.		5, 9, 11
Power of driving motor of machine	HP	10	25
Weight of machine	kg	4800	6000



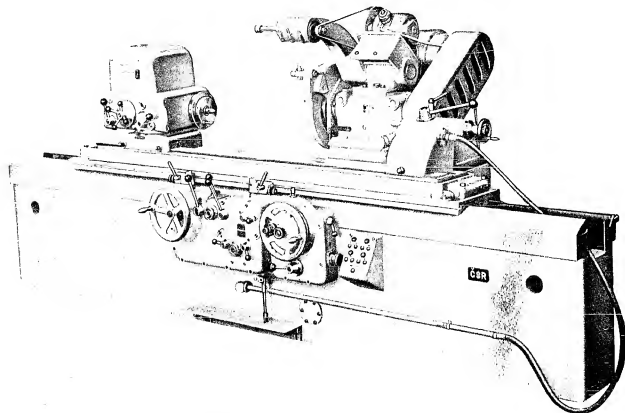
UNIVERSAL GRINDING MACHINES

UNIVERSAL GRINDERS Series U

Heavy Duty Precision Machines for cylindrical (traverse and infeed), as well as for internal taper and face grinding. They are provided with hydraulic table traverse and hydraulic infeed of the swivelling wheelhead. The workhead with 6 or 8 spindle speeds swivels 90 deg. for taper and face grinding. The numerous optional equipment contributes to the versatility of the machines.



Model	1U	2U	5U	7U
Maximum swing over table	mm 255	290	400	660
Maximum distance between centres	mm 400	500, 750, 1000	1000—2000	2500—3000
Work speeds	6	6	8	8
Range of work speeds	r.p.m. 30—980	30—980	15—375	12—290
Output of work head motor	kW 0.5	0.5	1	1.5
Speed of full size (worn out wheel)	r.p.m. 1950, 2660	1670-1800	1350/1600	1165/1390
Wheelhead motor, output	kW 3	4.1	7.5	10
Weight of machine with standard equipment	kg 1450	1850, 2200, 2450	5500, 6400	9100, 9900



PRAHA - CZECHOSLOVAKIA

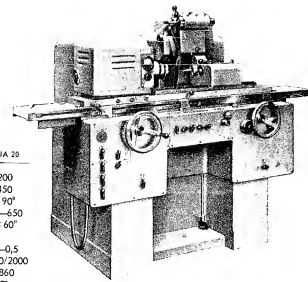
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UNIVERSAL GRINDING MACHINES

HYDRAULIC UNIVERSAL GRINDING MACHINE Type BUA 20

This machine is intended for the single part as well as quantity production. It can be used for cylindrical (traverse and infeed), internal, face, taper and plain grinding.

Main features: single lever operation, automatic working cycle, infinitely variable hydraulic table traverse, hydraulic rapid traverse of wheelhead which swivels 60 deg. in either direction, infinitely variable spindle speeds, and high output of main drive motor.



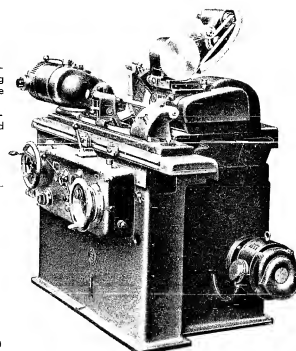
Model	BUA 20
Maximum swing over table	mm 200
Maximum distance between centres	mm 450
Work head swivels	deg. 90°
Work spindle speeds, ranging from	r.p.m. 30—650
Wheelhead swivels in both directions	deg. ± 60°
Automatic infeed (either in left or right hand or in both reversals)	mm on dia. 0—0.5
Speed of full size / worn out wheel	r.p.m. 1750/2000
Wheelhead motor speed	r.p.m. 2860
Table swivels	deg. 9°
Table speeds infinitely variable	per min. 0.05—9
Floor space (width x length)	mm 1440x2000
Weight of machine with standard equipment	kg 1700

HYDRAULIC UNIVERSAL GRINDERS Types BK 3 and BK 5

These machines are intended both for the quantity and single part production. They are suitable for cylindrical (traverse and infeed) grinding and by using the hinged internal grinding attachment also for the grinding of holes.

The main advantages of these machines are: infinitely variable hydraulic table traverse, hydraulic rapid traverse of the swivelling wheelhead and high output of the main drive motor.

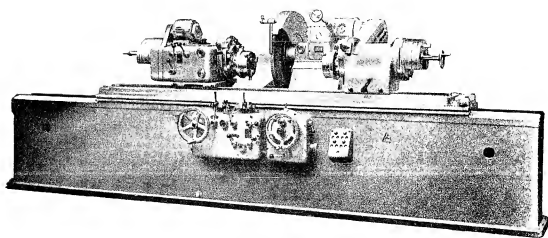
Model	BK 3	BK 5
Maximum swing over table	mm 250	315
Maximum distance between centres	mm 500, 750	750, 1000, 1500
Workhead swivels	deg. 60°	60°
Work spindle speeds, ranging from	r.p.m. 50—750	25—600
Wheelhead swivels	deg. 60°	60°
Automatic infeed in table	mm per min. 0.0025	0.0175
reversals	mm per min. 0.05	1.4
Automatic independent infeed	HP 6	9.5
Output of motor	kg 1800, 2100	2900, 3200, 3600
Weight of machine		



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41

CRANKSHAFT GRINDING MACHINES



CRANKSHAFT GRINDING MACHINES
Types 4C and 7CD

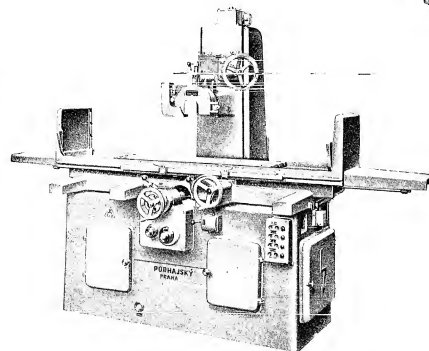
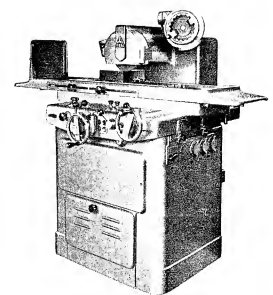
Heavy duty precision machines for the regrounding of main and big end journals of crankshafts as well as for the grinding of these journals in repetition work. Due to the fact that the machines are equipped with a hydraulic feed of the table and an automatic feed of the wheelhead they can also be used as standard cylindrical grinders.

Type	4C	7CD
Maximum diameter of workpiece - - - mm	500	600
Maximum distance between chucks - - - mm	1200 1700	1650 2150 2700
Distance between centres - - - mm	1320 1820	1900 2400 2950
Maximum eccentricity of pins - - - mm	120	120
Grinding wheel speed - - - r.p.m.	805, 1020	660, 795
Swivel of table - - - °	5°	4.2° 3.6°
Infinitely variable table speed metres per min.	0.1 to 7	0.1 to 5
Power of motor of wheelhead - - - HP	6.8	19
Floor space required by machine - - - mm	2500x5200, 5700	2650x5650, 6650, 7550
Weight of machine with standard equipment - kg	6600 7200	8700 10000 11500

SURFACE GRINDING MACHINES

SURFACE GRINDING MACHINES
Types BPH 20 and BPH 300

Machines for precision grinding of plane surfaces, also with longitudinal steps, in individual manufacture as well as repetition work. The wheelhead is adjustable for height, the position of the grinding wheel is accurately adjustable according to the dimension of the surface being ground. The working table has infinitely variable hydraulic feeds. The type BPH machine can be set for an automatic working cycle.



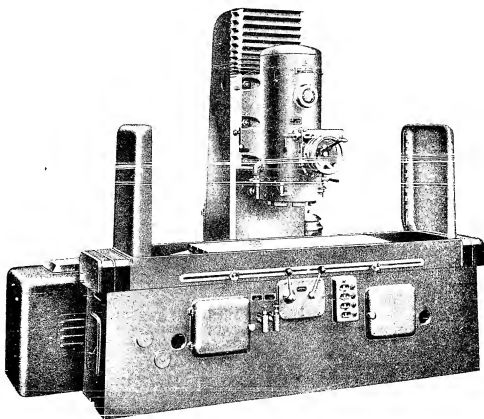
Type	BPH 20	BPH 300
Clamping surface of table - - - mm	220 X 630	300 X 1000
Diameter of grinding wheel - - - mm	250	250
Longitudinal travel of table - - - mm	690	1080
Vertical movement of wheel head - - - mm	350	370
Rate of longitudinal feed of table infinitely variable within range of - - - metres per min.	1 to 18	1 to 16
Power of motor - - - HP	1.9	2.7
Floor space required by machine - - - mm	1350 X 2460	1625 X 4100
Weight of machine - - - kg	1380	2900

SURFACE GRINDING MACHINES

SURFACE GRINDING MACHINES Types BPV 300 and BPV 700

These machines are intended for the grinding of plane surfaces and are suitable for individual manufacture, repetition work as well as quantity production. The wheelhead has a coarse as well as a fine vertical adjustment. The grinding spindle is formed by the rotor shaft of the driving motor which is built into the wheel head body. The wheel head has a rapid power traverse driven by its own electric motor or a fine hand feed or hydraulic feed in either dead centre of the table.

The machines may be equipped with an electromagnetic chuck.



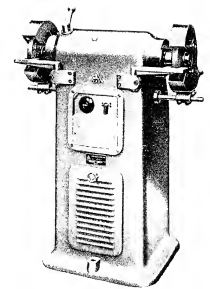
Type	BPV 300	BPV 700
Clamping surface of table	mm 300 / 1000 300 / 1500	600 / 1500 600 / 3000
Maximum width of grinding	mm 300	700
Maximum distance, face of grinding wheel to surface of table	mm 500	600
Longitudinal travel of table	mm 1385	2050
Feed of longitudinal table, infinitely variable within range of	metres per min. 1 to 16	1 to 12
Vertical power feed of wheel head in dead centre of table ranging from	mm 0.004 to 0.1	0.004 to 0.1
Rate of vertical power feed of wheel head	metres per min. 0.825	0.6
Power of electric motor for drive of grinding spindle	HP 20	30
Floor space required by machine	mm 1515 x 3825 1515 x 5480	2275 x 6850 2275 x 10020
Weight of machine	kg 3500 3900	11500 13000

TOOL GRINDING MACHINES

TWO-WHEEL GRINDERS Types BL 3 and BL 4

These machines are intended for grinding the burrs of castings and forgings, welds and for sharpening cutters, chisels, etc. With the use of suitable buffs they may also serve as buffing machines.

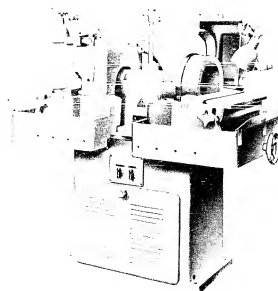
Type	BL 3	BL 4
Grinding wheel diameter	mm 225	350
Spindle speed for grinding	r.p.m. 2800	2710
Spindle speed for buffing	r.p.m. 4100	4370
Power of electric motor	HP 3	4.5
Floor space required by machine	mm 550 x 950	700 x 1350
Weight of machine	kg 360	500



TWO-WHEEL LATHE TOOL GRINDER Type BBT 350

This machine is intended for grinding the cutting surfaces of cemented carbide tipped tools and high speed steel tools. It is equipped with wheel truing devices mounted on swivelling holders.

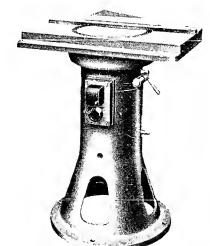
Type	BBT 350
Grinding wheel diameter	mm 350
Dimensions of tables	mm 210 x 560
Hand movement of tables	mm 25
Maximum angle of tilt of tables	20°
Power of electric motor	HP 2
Floor space required by machine	mm 860 x 1420
Weight of machine	kg 820



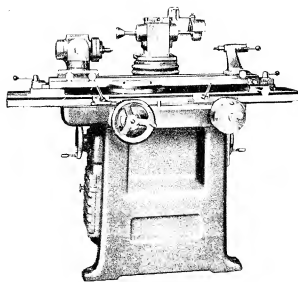
SURFACE TABLE GRINDER Type BM 400

This machine is intended for the hand grinding of plane surfaces in individual manufacture as well as in repetition work, particularly during assembly modifications of machined parts. The grinding is done dry without the workpiece being clamped.

Type	BM 400
Dimensions of table (length x width)	mm 800 x 550
Grinding wheel diameter	mm 400
Vertical movement of grinding wheel	mm 70
Power of electric motor	HP 3
Floor space required by machine	mm 550 x 800
Weight of machine	kg 270



TOOL GRINDING MACHINE



UNIVERSAL TOOL GRINDER
Type BN 102

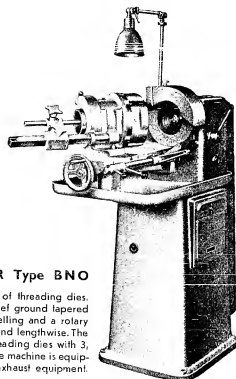
This machine is intended for sharpening various cutting tools such as cylindrical and tapered reamers, end and side milling cutters with straight or helical cutting edges, recessed milling cutters, and milling cutters, taps, countersinks, saws, lathe tools, etc. As optional equipment are available cylindrical, surface and internal grinding attachments, an attachment for sharpening twist drills, an attachment for sharpening cemented carbide tipped tools as well as various other attachments and equipments which increase the versatility of the machine so that it satisfies the demands of modern tool shops.

Type	BN 102
Grinding diameter - - - - -	mm 280
Distance between headstock and tailstock centres - - - - -	mm 500
Surface of table - - - - -	mm 920 x 140
Wheel spindle speed - - - - -	r. p. m. 2800, 5600
Power of motor - - - - -	HP 1.5
Floor space required by machine - - - - -	mm 1465 x 1940
Weight of machine - - - - -	kg 1000

TWIST DRILL GRINDING MACHINE Type BNV 75

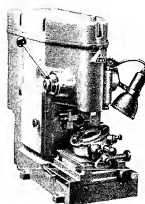
The machine is intended for grinding twist drills with two cutting edges. The drills are clamped between two self-centering jaws of a chuck which rotates at a uniform rate during grinding. The special point of the drill obtained by grinding on this machine makes it possible to drill with a lower cutting pressure of the tool and requires less power than drills ground on most other machines.

Type	BNV 75
Minimum diameter of drill being ground - - - - -	mm 75
Maximum diameter of drill being ground - - - - -	mm 15
Minimum apex angle of drill being ground - - - - -	80°
Maximum apex angle of drill being ground - - - - -	160°
Grinding wheel diameter - - - - -	mm 225
Grinding wheel speed - - - - -	r. p. m. 2800
Power of main motor - - - - -	HP 1.5
Floor space required by machine - - - - -	mm 1240 x 648
Weight of machine - - - - -	kg 300



THREADING DIE GRINDER Type BNO

This machine is intended for the sharpening of threading dies. It grinds the face and back as well as the relief ground tapered surface. The threading die chuck has a swivelling and a rotary movement. It can also be adjusted crosswise and lengthwise. The dividing mechanism of the chuck permits threading dies with 3, 4, 5 and 6 cutting edges to be sharpened. The machine is equipped with a wheel truing device and dust exhaust equipment.



Type	BNO
Maximum diameter of threading die: outside diameter - - - - -	mm 75
diameter of thread - - - - -	mm 42
Spindle speed - - - - -	r. p. m. 24000
Travel of spindle - - - - -	mm 40
Number of divisions on chuck - - - - -	3, 4, 5, 6
Angle of swirl of chuck - - - - -	° 20°
Power of electric motor - - - - -	HP 0.7
Floor space required by machine - - - - -	mm 310 x 610
Weight of machine - - - - -	kg 85

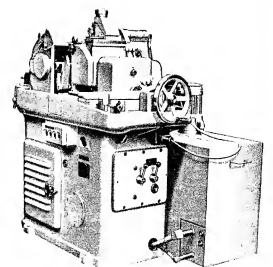
CENTRELESS GRINDING MACHINES

CENTRELESS GRINDING MACHINE
Type BBZ 60

A machine for precision grinding of external cylindrical and tapered surfaces on plain, shouldered and other shaped rotating objects. Suitable for grinding hardened as well as unhardened steel, copper or aluminium alloys, plastics, glass and other materials.

The following optional equipment is available for the machine: workrest blades for grinding parts with a small diameter, workrest blades for special shapes, templates for special shapes, supports for grinding long bars, an automatic hydraulic magazine feed attachment.

Type	BBZ 60
Through-feed grinding:	
With standard equipment workpieces of the following dimensions can be ground: diameter - - - - -	mm 3 to 60
maximum length - - - - -	mm 220
With optional equipment workpieces of the following dimensions can be ground: diameter - - - - -	mm 1.5 to 3
maximum length - - - - -	mm 220
Maximum length for infeed grinding - - - - -	mm 75
Speed of grinding wheel - - - - -	r. p. m. 1900
Number of regulating wheel speeds - - - - -	r. p. m. 6
Range of regulating wheel speed - - - - -	r. p. m. 19 to 340
Power of motor - - - - -	HP 10
Floor space required - - - - -	mm 1005 x 1445
Weight of machine with standard equipment - - - - -	kg 1100

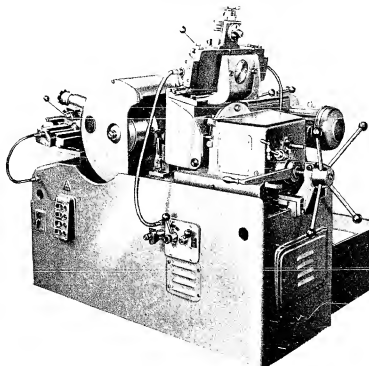


CENTRELESS GRINDING MACHINE Type 4B

The machine is suitable for through-feed grinding of external cylindrical surfaces and for infeed grinding of shouldered tapered parts and parts of special shapes up to a diameter of 100 mm.

The grinding wheel spindle, regulating wheel spindle, hydraulic drive of wheel truing device and coolant and lubricating oil pumps are driven by independent electric motors. The coarse and fine setting of the regulating wheel spindle head is done by hand.

The grinding wheel and regulating wheel heads are fitted with their own hydraulically controlled truing devices by means of which the wheels can be trued even for infeed grinding and form grinding.



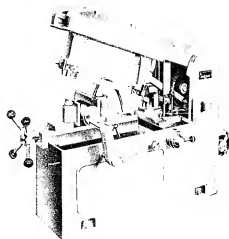
Type	4B
Through-feed grinding, maximum minimum diameter - - - - -	mm 100/4
Maximum length for through-feed grinding - - - - -	mm 200
Maximum length for infeed grinding - - - - -	mm 200
Speed of grinding wheel - - - - -	r. p. m. 1320 to 1500
Speeds of regulating wheel ranging from - - - - -	r. p. m. 15 to 264
Total power of electric motors - - - - -	HP 25
Floor space required - - - - -	mm 1550 x 2200
Weight of machine with standard equipment - - - - -	kg 3700

METAL SAWING MACHINES

HACKSAW MACHINES Type PR 20 and PR 30

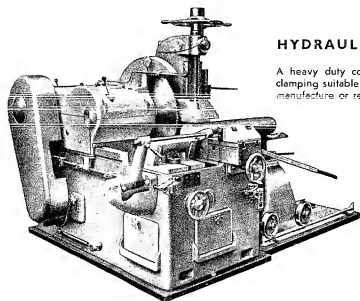
Machines for the cutting of metals of various shapes and hardness. The arm is controlled hydraulically by a single lever. The pressure of the arm increases gradually in the course of the cut and the arm is relieved during the return movement. The cut being finished the arm returns automatically to its raised position which is adjustable according to the size of material being cut.

T y p e	PR 20	PR 30
Maximum size of square and round material being cut - - - - - mm	200	300
Maximum size of material cut at 45° - - - - - mm	115	180
Stroke of frame - - - - - mm	140	200
Number of double strokes of saw blade per minute	104 to 84	80 to 60
Power of motor - - - - - HP	3	2
Floor space required by machine - - - - - mm	550x1500	850x1840
Weight of machine with standard equipment - - - - - kg	472	1120



HYDRAULIC CIRCULAR SAW Type P 27

A heavy duty cold sawing machine with hydraulic feed and hydraulic clamping suitable for medium size and large shops engaged in individual manufacture or repetition work.

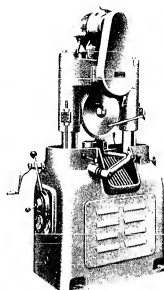


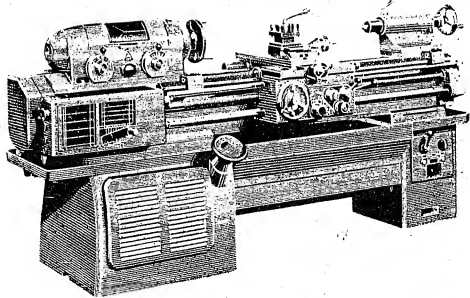
T y p e	P 27
Diameter of saw blade - - - - - mm	640 710 760
Maximum size of stock for perpendicular cuts: round stock - mm	220 245 270
square stock - mm	200 210 245
Number of saw blade speeds	4
Speeds of saw blade - - - - - r. p. m.	5.5 7.5 10 13
Hydraulic feeds, infinitely variable, ranging from mm per min.	0 to 400
Floor space required by machine - - - - - mm	1400x2100
Weight of machine with standard equipment - - - - - kg	3420

CIRCULAR SAW Type H 350

A heavy duty cold sawing machine for medium size and large shops engaged in individual manufacture or repetition work. The machine is equipped with infinitely variable hydraulic feed of the saw blade into the cut. The machine is equipped with infinitely variable hydraulic feed of the saw blade into the cut. The clamping of the stock is likewise hydraulic.

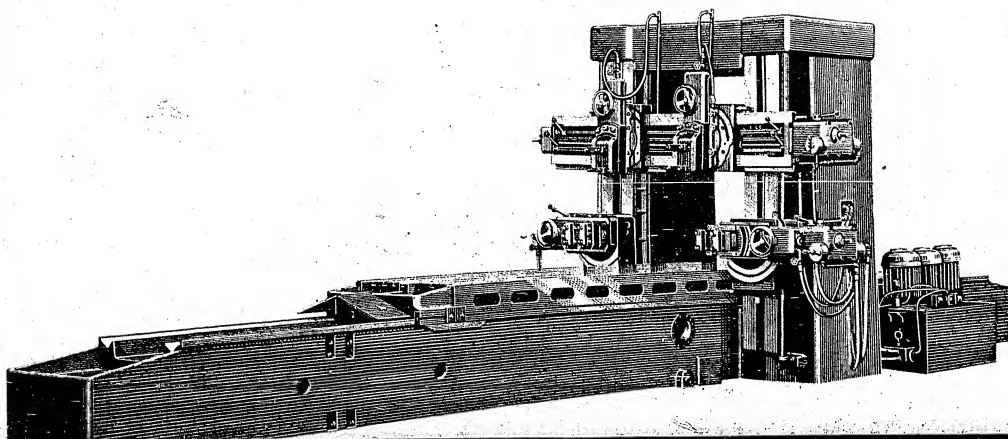
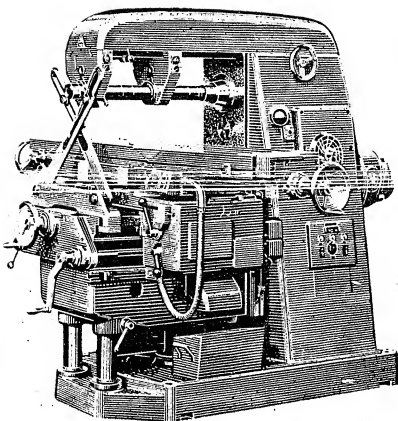
T y p e	H 350
Maximum diameter of saw blade - - - - - mm	360
Maximum size of stock: round stock - - - - - mm	115
square stock - - - - - mm	110
oblong stock - - - - - mm	160x165
Number of cutting speeds	4
Range of cutting speeds with 310 mm dia. of saw blade - - - - - r.p.m.	17.5 to 35
Range of hydraulic feeds - - - - - mm per min.	0 to 500
Power of headstock motor - - - - - HP	4
Floor space required by machine - - - - - mm	1100x760
Weight of machine with standard equipment - - - - - kg	790





STAT

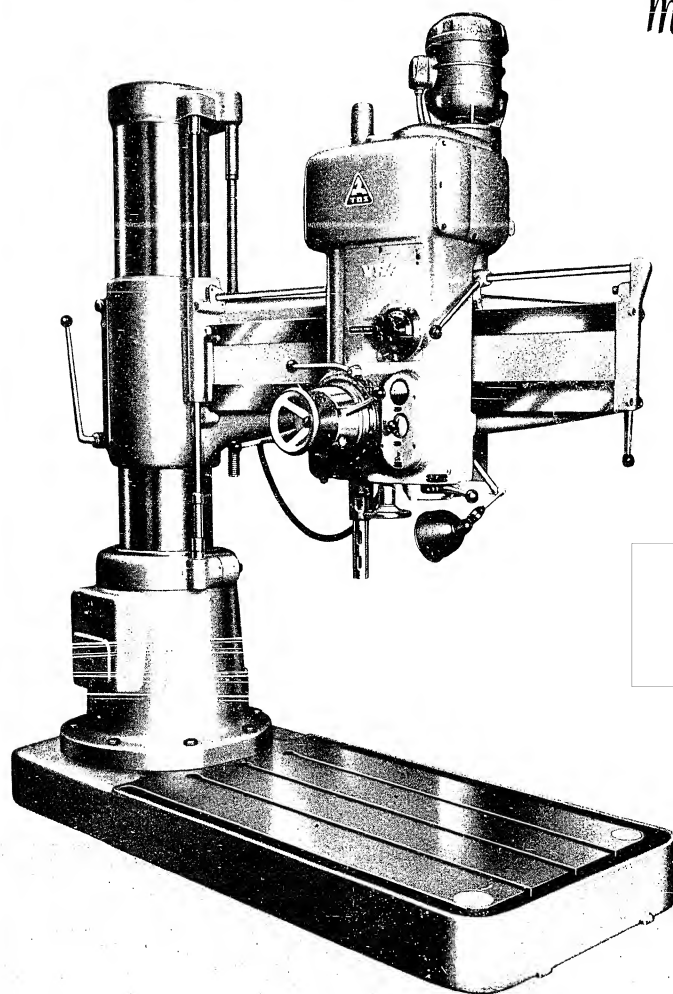
STROJEXPORT
PRAHA - CZECHOSLOVAKIA



RADIAL DRILLING MACHINE

Model

4



STAT

High output of the machine combined with lasting accuracy ■ Large working surface and wide range of distances between spindle and base allow big and relatively high pieces to be machined as well as very low ones (drilling of holes in metal sheets) ■ Rigidity of the machine within limits established by taking-over conditions in all working positions ■ Simplified and easy operation: small number of conveniently arranged controls centralised on spindle head ■ Patent guiding arrangement of sleeve by means of ball bearings running in hardened track on column ■ Patent positive locking of sleeve on column by means of locking nut ■ Sleeve locked on column and spindle head locked on arm by single lever ■ Control of drilling and elevating motors by single cross-type switch ■ Pre-selection and engagement of drilling spindle speeds and control of two-directional multi-plate clutch by single lever ■ Wide range of spindle speeds, 12 in number ■ Wide range of power feeds of the drilling spindle, 10 in number ■ 3 different ways of feeding the drilling spindle: coarse by hand, fine by hand, by power ■ Attachment for automatic release of the power feed when the required depth of drilling is reached ■ Automatic lubrication of the headstock unit by the circulation system.

SPECIFICATIONS:

CAPACITY:

Maximum diameter when drilling steel having a tensile strength of 60 kg per square mm . . . mm
 Maximum diameter when drilling cast iron having a tensile strength of 25 kg per square mm . . . mm
 Maximum diameter when boring steel having a tensile strength of 60 kg per square mm . . . mm
 Maximum diameter when boring cast iron having a tensile strength of 25 kg per square mm . . . mm
 Maximum size of thread cut in steel having a tensile strength of 60 kg per square mm . . .
 Maximum size of thread cut in cast iron having a tensile strength of 25 kg per square mm . . .

Metric	English
40	1.57"
50	2"
90	3.5"
100	3.93"
M 24	1"
M 36	1.5"

MAIN DIMENSIONS:

Maximum distance, centre-line of spindle to sleeve . . . mm
 Minimum distance, centre-line of spindle to sleeve . . . mm
 Maximum pitch circle of drilled holes . . . mm
 Minimum pitch circle of drilled holes . . . mm
 Maximum and minimum distance, spindle to base . . . mm
 Maximum and minimum distance, spindle to table . . . mm
 Diameter of column . . . mm
 Vertical movement of arm on column . . . mm
 Horizontal movement of spindle head on arm . . . mm
 Swing of arm on column . . . mm

1255	49"
310	12"
2830	111"
935	36.8"
1300-260	51" / 10.2"
750-0	29.5" / 0"
315	12.4"
710	28"
945	37"
0°-360°	

SPINDLE:

Diameter of end of spindle . . . mm
 Taper in spindle . . . Morse
 Diameter of spindle . . . mm
 Stroke of spindle . . . mm
 Spindle speeds: Number of steps . . .
 standard range . . . r. p. m.
 lower range . . . r. p. m.
 increased range . . . r. p. m.
 Spindle feeds: Number . . .
 range . . . mm per rev.

70	2.76"
4	4
35	1.38"
310	12.2"
12	12
45	2000
31	1400
63	2800
10	10
0.025-1.5816	0.010 cuts p. in.

BASE:

Working surface . . . mm
 Number, width and distance of T-slots . . . mm

1475×900	57.9"×35.5"
3×25×190	3×0.98"×7.45"

DRIVE:

Drilling motor: output/speed . . . kW/r. p. m.
 Elevating motor: output/speed . . . kW/r. p. m.
 Coolant pump motor: output/speed . . . kW/r. p. m.

3.1410
1.11390
0.125/2800

DIMENSIONS AND WEIGHTS:

Dimensions of base . . . mm
 Overall dimensions of machine . . . mm
 Working space required . . . mm
 Weight of machine with standard equipment . . . kg
 Weight of machine with packing . . . kg
 Weight of machine with seaworthy packing . . . kg
 Dimensions of seaworthy packing . . . m
 Volume of seaworthy packing . . . m³

2240×910	88"×36"
2290×910×2860	90"×36"×112"
3060×3960×2260	155"×155"×89"
2750	5600 lbs
2690	5900 lbs
3320	7300 lbs
2.55×2.62×1.17	100"×103"×46"
7.8	260 cu. ft.

STANDARD EQUIPMENT:

electrical equipment including electric motors, cooling equipment, 3 reducing sleeves
 Morse 43, 3, 2/1, ejecting wedges, set of spanners, oil can, T-slot cleaner, screw driver,
 hooks for lifting including bolts, nuts, T-blocks and plugs, instruction book.

SPECIAL EQUIPMENT:

1 change gears for lower range of spindle speeds 31 - 1400 r. p. m. style Ve 4,
 2 change gears for increased range of spindle speeds 63-2800 r. p. m. style Ve 4, box table style Vb 4, universal table style Ve 4, vice style Vd 4.

IN ORDERING,
 SPECIFY VOLTAGE,
 PHASE
 AND FREQUENCY
 OF POWER SUPPLY

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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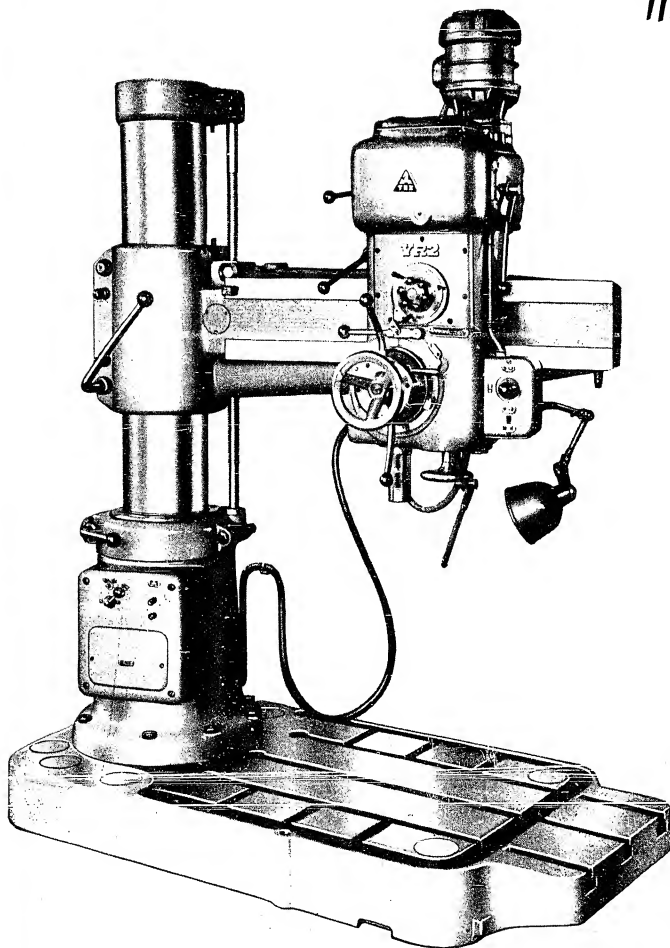
P R A H A — C Z E C H O S L O V A K I A

Printed in Czechoslovakia

RADIAL DRILLING MACHINE

Model

2



High output of the machine combined with lasting accuracy. ■ Rigidity of the machine within limits established by taking-over conditions in all working positions ■ Simplified and easy operation; small number of conveniently arranged controls centralised on spindle head ■ Arm elevated by power ■ Sleeve locked on column by single lever ■ Spindle head locked on arm also by single lever ■ Control of drilling and elevating motors by single cross-type switch ■ Wide range of spindle speeds, 12 in number ■ 6 power feeds of the drilling spindle ■ 3 different ways of feeding the drilling spindle: coarse by hand, fine by hand, by power ■ Attachment for automatic release of the power feed when the required depth of drilling is reached ■ Automatic lubrication of the headstock unit by the circulation system.

SPECIFICATIONS:

CAPACITY:

Maximum diameter when drilling steel having a tensile strength of 60 kg per square mm . . . mm
 Maximum diameter when drilling cast iron having a tensile strength of 25 kg per square mm . . . mm
 Maximum diameter when boring steel having a tensile strength of 60 kg per square mm . . . mm
 Maximum diameter when boring cast iron having a tensile strength of 25 kg per square mm . . . mm
 Maximum size of thread cut in steel having a tensile strength of 60 kg per square mm . . .
 Maximum size of thread cut in cast iron having a tensile strength of 25 kg per square mm . . .

Metric English

25 1"
 35 1 1/4"
 50 2"
 60 2 3/8"
 M 16 5/8"
 M 20 3/4"

MAIN DIMENSIONS:

Maximum distance, centre-line of spindle to sleeve . . . mm
 Minimum distance, centre-line of spindle to sleeve . . . mm
 Maximum pitch circle of drilled holes . . . mm
 Minimum pitch circle of drilled holes . . . mm
 Maximum and minimum distance, spindle to base . . . mm
 Maximum and minimum distance, spindle to table . . . mm
 Diameter of column . . . mm
 Vertical movement of arm on column . . . mm
 Horizontal movement of spindle head on arm . . . mm
 Swing of arm on column . . .

800 31.5"
 210 8 2/5"
 910 36"
 340 13.4"
 1015-267 40" 10.4"
 615-0 24 3/8"
 229 9 1/8"
 530 21"
 590 23"
 0 10 360

SPINDLE:

Diameter of end of spindle . . . mm
 Taper in spindle . . . Morse
 Diameter of spindle . . . mm
 Stroke of spindle . . . mm
 Spindle speeds: Number of steps . . . r. p. m.
 standard range . . . r. p. m.
 to special order . . . r. p. m.
 Spindle feeds: Number . . . mm per rev.
 range . . . mm per rev.

55 2.16"
 3 3
 25 0.98"
 225 8.8"
 12 42
 90-4500 90-4500
 56-2800 56-2800
 6 6
 0.03-0.3 SG 850 cuts p. in.

BASE:

Working surface . . . mm
 Number, width and distance of T-slots . . . mm

850×780 33.5"×30.6"
 3×25×190 3×0.98"×7.45"

DRIVE:

Drilling motor: output/speed . . . kW/r. p. m.
 Elevating motor: output/speed . . . kW/r. p. m.
 Coolant pump motor: output/speed . . . kW/r. p. m.

1.5 1400
 0.5 1390
 0.125 2800

DIMENSIONS AND WEIGHTS:

Dimensions of base . . . mm
 Overall dimensions of machine . . . mm
 Working space required . . . mm
 Weight of machine with standard equipment . . . kg
 Weight of machine with packing . . . kg
 Weight of machine with seaworthy packing . . . kg
 Dimensions of seaworthy packing . . . m
 Volume of seaworthy packing . . . m³

1600×800 63"×31.5"
 1600×800×2245 63"×31.5"×88.5"
 2600×2550×2250 102"×100"×88.5"
 1250 2750 lbs
 1350 2950 lbs
 1700 3730 lbs
 2.05×1.05×1.892 80"×41.5"×74"
 4.1 145 cu. ft.

STANDARD EQUIPMENT:

electric equipment including electric motors, cooling equipment, 3 reducing sleeves, Morse 3.2, 3.1, 1.0, 3 ejecting wedges, set of spanners, oil can, T-slot cleaner, screw driver, 2 grip holders (up to 5 mm dia., 2 10 mm dia.), hooks for lifting of spindle head including bolts, nuts, T-blocks and plugs, instruction book.

SPECIAL EQUIPMENT:

2 change wheels for lower range of spindle speeds 56-2800 r. p. m style Vs 2, box table style Vb 2, universal table style Vc 4, vice style Vd 4, operator's seat style Vo 2.

IN ORDERING,
 SPECIFY VOLTAGE
 PHASE
 AND FREQUENCY
 OF POWER SUPPLY

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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P R A H A — C Z E C H O S L O V A K I A

COK 53618 a -- 5505

Printed in Czechoslovakia

SPECIFICATION:

	Metric	English
Diameter of spindle	mm	160
Taper in spindle	metric	6.3"
Maximum torque on spindle	kg/cm	100
on face plate	kg/cm	25 000
		22000 lbs. ins.
		80 000
		71000 lbs. ins.

WORKING RANGES:

Maximum diameter of boring with boring spindle	mm	1000	39.3"
Maximum diameter of facing with facing slide rest	mm	1300	51"
Maximum sliding movement of spindle:			
continuous	mm	1200	47"
additional	mm	600	23.6"
Vertical movement of spindle head	mm	1900	75"
Height of centre line of spindle above table	mm	0-1900	0-75"
Diameter of face plate	mm	810	31.8"
Maximum distance, face plate to boring bar support	mm	4400	173"

TABLE:

Clamping surface	mm	1600 X 1800	63" X 71"
Longitudinal movement	mm	2500	98"
Transverse movement	mm	2000	79"

SPEEDS:

Spindle speeds arranged in 24 steps	r. p. m.	2.25-450	2.25-450
Face plate speeds arranged in 12 steps	r. p. m.	2.25-48	2.25-48

FEEDS:

Boring: of spindle arranged in 16 steps	mm per rev.	0.04-8	3-635 c. p. l.
of table arranged in 8 steps	mm per rev.	0.11-2.8	9-231 c. p. l.
Milling: of spindle head and table arranged in 8 steps	mm per min.	18-450	0.7-17.7" p. m.
of facing slide rest arranged in 16 steps	mm per rev.	0.045-18	0.0017-0.7" p. r.

RAPID TRAVELS:

Rapid travel of spindle	mm per min.	4500 or 560	177" or 22" p. m.
Rapid travel of spindle head	mm per min.	900	35.5" p. m.
Rapid travel of facing slide rest	mm per min.	670	26.3" p. m.
Longitudinal rapid travel of table	mm per min.	1400	55" p. m.
Transverse rapid travel of table	mm per min.	900	35.5" p. m.
Circular rapid travel of table:			
on diameter scale of 1800 mm	mm per min.	3600	142" p. m.
or expressed in revolutions of table	r. p. m.	0.64	0.64 r. p. m.

BACK REST:

Motor for movement of back rest on bed and of boring bar support			
on back rest column:			
output	kW	2.2	2.2
speed	r. p. m.	940	940

THREADING:

22 metric threads with pitches of	mm	0.5-12	0.02"-0.5"
32 Whitworth threads with	turns per inch	28-1	28-1

DRIVE:

Main motor:			
output	kW	18	18
speed	r. p. m.	940	940

DIMENSIONS AND WEIGHTS:

Floor space of machine	approx. mm	8800 X 3800	345" X 149"
Weight of machine with standard equipment	approx. kg	35500	79000 lbs.

STANDARD EQUIPMENT:

Complete electrical equipment, face plate with facing slide rest for facing of flanges, measuring set with 2 dial type error gauges for horizontal and vertical precision measurements, set of change gears for threading, cooling equipment with electrically driven pump and piping, indicating plates on machine, grease gun, spanners and cranks for attendance, operating instructions booklet.

WHEN ORDERING, PLEASE ALWAYS STATE THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS.

The machines are continuously being improved upon. The particulars given in the prospectus are therefore not binding in detail.

ŠKODA HORIZONTAL TABLE TYPE BORING AND MILLING MACHINE

HVF 160 S

The machine is intended for drilling, boring, reaming and threading operations on big machinery parts, etc. It has a fixed column, a table with a longitudinal, transverse and circular movement and a back rest with a boring bar support which makes it particularly suitable for applications where boring operations predominate.

The machine is normally built as a right hand unit (i. e. with the column and head at the right hand side and the table at the left hand side).

OUTSTANDING FEATURES

High output.

High speed of spindle running in special adjustable anti-friction bearings. This arrangement permits cemented carbide tipped tools to be fully utilized for boring as well as for milling.

Electric speed indicator of spindle as well as face plate speeds.

Independent spindle and face plate drive affording most varied combinations of operations.

Face plate with facing slide rest for automatic facing.

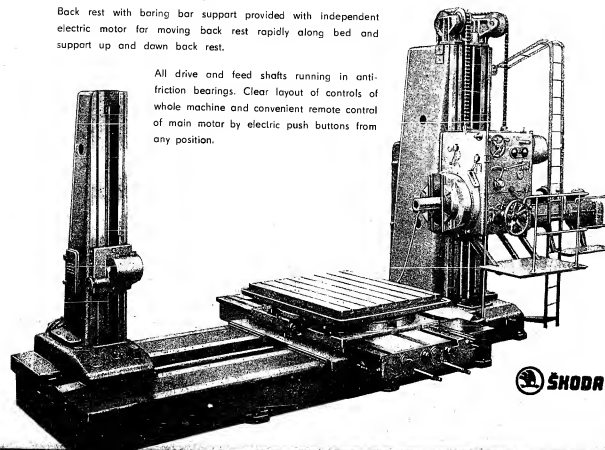
Cutting of metric and Whitworth threads of all current sizes.

Accurate setting of spindle, spindle head, table and boring bar support on back rest by means of precision scales with verniers or by dial-type error gauges.

Feeds and rapid travels of all parts of machine can be limited by limit switches. Boring feed of spindle can be disengaged by means of adjustable stops.

Back rest with boring bar support provided with independent electric motor for moving back rest rapidly along bed and support up and down back rest.

All drive and feed shafts running in anti-friction bearings. Clear layout of controls of whole machine and convenient remote control of main motor by electric push buttons from any position.



ŠKODA

STROJEXPORT PRAHA - CZECHOSLOVAKIA

DESCRIPTION

THE DRIVE. The machine is driven directly by a flange-mounted reversible squirrel cage electric motor provided with an "ALNICO" brake outfit. The load of the motor can be checked by means of an ammeter fitted to the spindle head.

THE SPINDLE HEAD is designed as a self-contained unit with its own electric motor and complete drive of the spindle and face plate and of the feeds and rapid travels. The speeds and feeds are changed by means of gears sliding on spline shafts running in anti-friction bearings throughout. The gears are hardened and those with higher peripheral speeds are ground. A setting of the height of the spindle on the column accurate within 0.05 mm (0.002"), or even more accurately, is made possible by a dial-type error gauge by means of a scale with a vernier.

THE SPINDLE runs in four particularly accurate and adjustable anti-friction bearings. The hollow shaft of the face plate runs in a finely adjustable plain bearing. The spindle and face plate can run mutually entirely independently, i. e. either each separately or both together in which case they either run both at the same low speed or the spindle runs 16 times as fast as the face plate. This combination can be used to advantage for simultaneous boring by means of the spindle and machining of flanges by means of the facing slide rest. The speeds of the spindle and face plate are indicated by an electric speed indicator.

THE FACE PLATE is keyed to a hollow spindle and provided with a facing slide rest for facing which moves independently of the spindle in either direction. The facing slide rest has its own rapid travel, the extreme positions being limited by positive stops, the drive being protected against damage by a ball type safety clutch.

THE FEEDS. The following power feeds are available on the machine: The boring feed (in mm per revolution of spindle). The required movement is given to the spindle (or

to the table slide). The spindle feed can be disengaged by adjustable stops. The milling feed (in mm per minute) by means of which the spindle head is moved vertically or the table crosswise. The feed of the facing slide rest (in mm per revolution of face plate). This feed is independent of the direction of rotation of the spindle.

THREADING is done by a sliding movement of the boring spindle. The movement is obtained from a lead screw with a positive drive from the spindle through a gear box with 17 change gears sufficient for cutting 22 metric and 32 Whitworth threads of the usual pitches.

THE COLUMN is box-shaped, of a sturdy design and reinforced with densely spaced ribs. It encloses the counterweight of the spindle head. In the rear part of the column the easily accessible electrical equipment cabinet is fitted and also the box with change gears for threading.

THE BED is of ample width and reinforced with ribs. The large guiding surfaces afford perfect guiding and a firm base for the column and for the large table even with the heaviest loads. The bed is provided with holes for the foundation bolts and with levelling screws for the erection of the machine on the foundation.

THE TABLE has a transverse movement in the guideways of the table slide which in turn moves longitudinally on the bed being driven by a pinion and rack. The slide can be rotated either mechanically or by hand and set accurately in four mutually perpendicular positions by means of folding stops or approximately at any angle by means of a large circular scale on the circumference of the table.

An accurate setting of the longitudinal as well as transverse position of the table is afforded by scales with verniers and, if necessary, by a dial type error gauge same as the setting of the spindle head. The extreme positions of the table slide and cross slide are secured by limit switches.

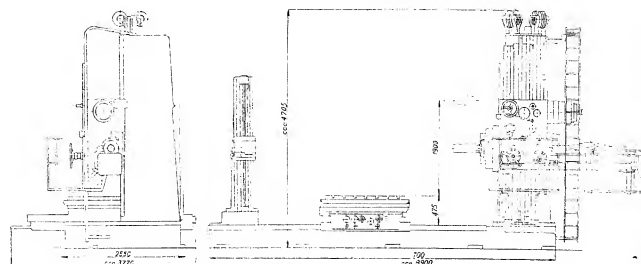
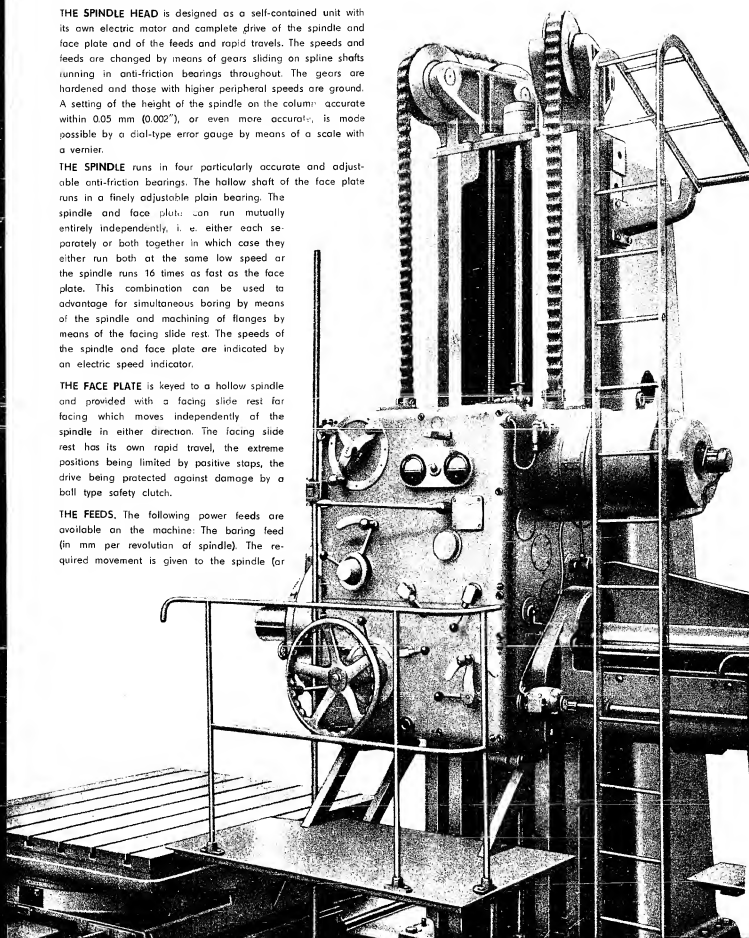
THE BACK REST is moved on the bed by its own electric motor independent of the table. The boring bar support is similarly mechanically moved on the vertical guideways of the back rest column. The support is set accurately by hand by means of a scale with a vernier.

THE LUBRICATION of the spindle head is a central splash lubrication with the oil being circulated by a gear-type pump. The operation of the pump is checked by a lubrication guard with a signal light. Similarly the table is centrally pressure lubricated by means of a hand operated lubricator.

THE COOLING SYSTEM is a circulating system with a coolant tank arranged in the bed. The coolant is circulated by an electrically driven centrifugal pump.

THE CONTROLS of the machine are simple and conveniently laid out. The main motor is controlled by electric push buttons fitted on the spindle head and also on a portable box with a long flexible cable. To facilitate changes of tools, adjustments and the sliding of gears a special inching push button is provided on the spindle head by means of which the machine is started and only kept running as long as the push button is being held depressed.

The controls of the clutches, of the engagement of speeds and feeds as well as the controls of all hand and power feeds of the spindle, face plate, facing slide rest, spindle head and table are suitably centralized on the spindle head and marked by appropriate plates and tables.





Specification

Diameter of spindle	mm	80	3 1/2"
Taper in spindle	Horse No.	5	5
Max. diameter for boring	mm	450	17 3/4"
Max. diameter for facing	mm	710	28"
Continuous / Additional feed to spindle	mm	710/355	28"/14"
Max. / Min. distance centreline of spindle to top of table	mm	8-900	0 - 35 1/2"
Max. distance facing head to bar support	mm	2240	88 1/2"
Diameter of facing head	mm	480	18 7/8"
Centering dia. of facing head	mm	250 H6	250 H6
Width of facing head centering surface	mm	6	1/4"
Working surface of table (width x length)	mm	900x1120	35 1/2" x 44 1/4"
Centering dia. of table	mm	140 H6	140 H6
Width of table centering surface	mm	6	1/4"
Automatic cross travel of table	mm	1000	39 1/2"
Automatic longit. travel of table when in cross position	mm	1100	43 1/2"
Automatic longit. travel of table when in longit. position	mm	1000	39 1/2"

Speed Range:

Number of spindle speeds	18	18
Low speed band I: speeds to spindle and facing head	r. p. m. 5.6-31.5	5.6-31.5
Middle speed band II: speeds to spindle and facing head	r. p. m. 22.4-150	22.4-150
High speed band III: speeds to spindle and facing head	r. p. m. 180-1000	180-1000

Feeds:

32 feeds to spindle per revolution	mm/rev.	0.02-12	.0008"-5"
32 vertical feeds to headstock per spindle revolution	mm/rev.	0.02-12	.0008"-5"
32 longitudinal feeds to table per spindle revolution	mm/rev.	0.02-12	.0008"-5"
32 cross feeds to table per spindle revolution	mm/rev.	0.02-12	.0008"-5"
32 feeds to facing head per spindle or facing slide revolution	mm/rev.	0.02-12	.0008"-5"
32 circular feeds to table per spindle revolution	mm/rev.	0.02-12	.0008"-5"
(referring to dia. 1000 mm)	mm/rev.	0.015-32	.0006"-87"
18 feeds to immobilized spindle	mm/min.	12.5-600	1/2"-24"
18 vertical feeds to headstock	mm/min.	12.5-600	1/2"-24"
18 longitudinal feeds to table	mm/min.	12.5-600	1/2"-24"
18 cross feeds to table	mm/min.	12.5-600	1/2"-24"
18 feeds to facing slide	mm/min.	12.5-600	1/2"-24"
18 automatic circular feeds to table on 1000 mm (39 1/2") dia.	mm/min.	22.5-1050	7/8"-41 1/2"
Rapid traverse to spindle, headstock, table and facing slide	mm/min.	2400	95"
(except circular movement of table)	r. p. m.	1.4	1.4
Rapid circular movement of table	r. p. m.	1.4	1.4

Threads:

18 metric threads, pitch	mm	0.25-12	
25 Whitworth threads, pitch	t. p. i.		2-120
R. p. m. of motor		1500	1500
HP of motor		7.5	7.5
Floor space required (width x length)	mm	2450x4950	96"x240"
Net weight of machine with standard equipment	kg	8150	18000 lbs
Weight of machine with packing	kg	9450	20800 lbs
Weight of machine with seaworthy packing	kg	9500	21200 lbs
Contents boxed	m ³	27	950 cu. ft.

IN ORDERING, SPECIFY PHASE, VOLTAGE AND FREQUENCY OF POWER SUPPLY!
As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

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Feeds

For drilling and boring 32 rates are available transmitted from the work spindle and ranging from 0.02 to 12 mm/rev. for the spindle feed, vertical travel of headstock and for longitudinal and cross travel of table. The same number and rates of feed are provided for the face plate. For milling, 18 rates for spindle feed, vertical travel of head and longitudinal as well as cross travel of table are available, independent of the spindle rotation and ranging from 12.5 to 600 mm per minute. The feed change is automatic.

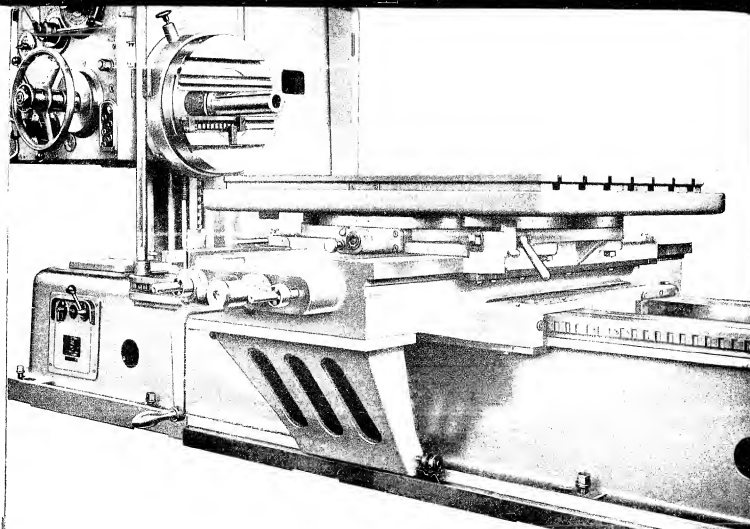
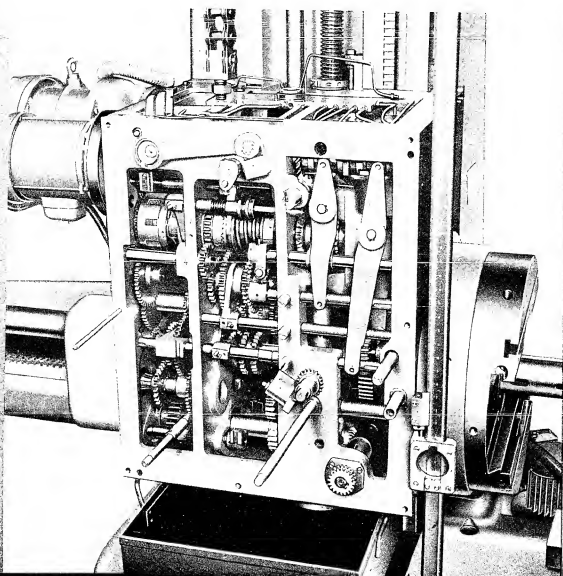
The machine is equipped with rapid motions in all directions. The rapid motions are independent of the work spindle rotation and act always in a direction opposite to the work feed, thus eliminating any damage to the work or tool. The rapid motion may be engaged automatically immediately after releasing the work feed.

Automatic release of work feeds and rapid motions in both directions of the horizontal spindle feed, vertical feed of headstock and longitudinal as well as cross feed of table are accomplished by adjustable stops.

Thread Cutting Attachment

The machine is arranged for cutting metric threads with a pitch of 0.25 to 12 mm and Whitworth threads of a pitch of 2 to 120 threads per inch.

The machine is fitted with a starting friction clutch against overload which is interposed between the motor and the gear mechanism. If the table strikes an obstacle, a safety clutch is put into operation and automatically disengages the working feed or the rapid traverse.



Table

The table is arranged for hand and power feed in the longitudinal and cross direction as well as for circular feed. The cross ways of the longitudinal slide are reinforced by special supports to eliminate any possibility of distortion of the table in its extreme cross positions even at maximum load.

The table is provided with accurately planed T-slots for clamping the work and in its centre with a centering hole for accurate location of the work or fixture.

Bed

The bed has wide, flat, accurately ground guides. It is adequately ribbed and enclosed at the top.

Column

The vertical guideways for the headstock are accurately ground, the right-hand guide being especially wide. Thus precision guiding of the headstock is ensured even after a long time of service.

Boring Bar Support

The boring bar support for supporting long boring bars is longitudinally adjustable by hand. The bar support bearing can be vertically moved by a handcrank and finely adjusted by a handwheel.

Lubrication

All bearings and gears in the headstock are lubricated by a geared pump. For inspecting the oil level an oil gauge and for the function of the pump an oil flow indicator are provided on the front of the headstock. The bearing and contact surfaces of the slide and table are lubricated by oil guns. The other oiling points are fitted with oilers located in plain view of the operator.

Electrical Equipment

The machine is driven by an asynchronous flanged type electric motor. Starting, stopping and reversing is by contactors controlled by pushbuttons on the front of the headstock. Pushbuttons serve for fine adjustment of the spindle or face plate when setting-up the machine.

The loading of motor is visible on the ammeter.

The motor is protected against overload by fuses and thermal protective relays.

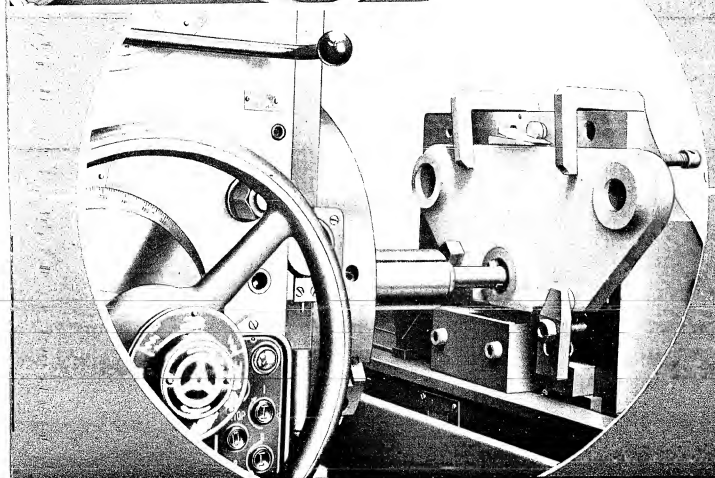
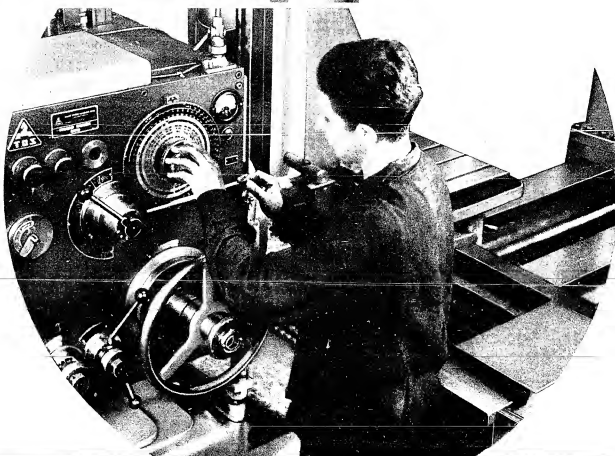
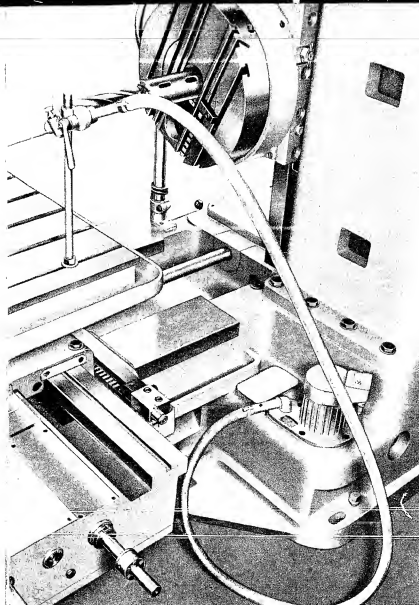
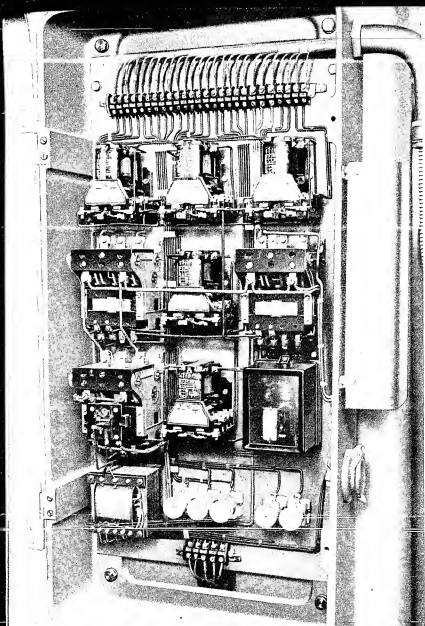
The machine can only be driven by a 3-phase A. C. for 380 volts, 50 cycles, with a zero conductor. Machines for an abnormal voltage and frequency can only be supplied on special order.

Cooling attachment

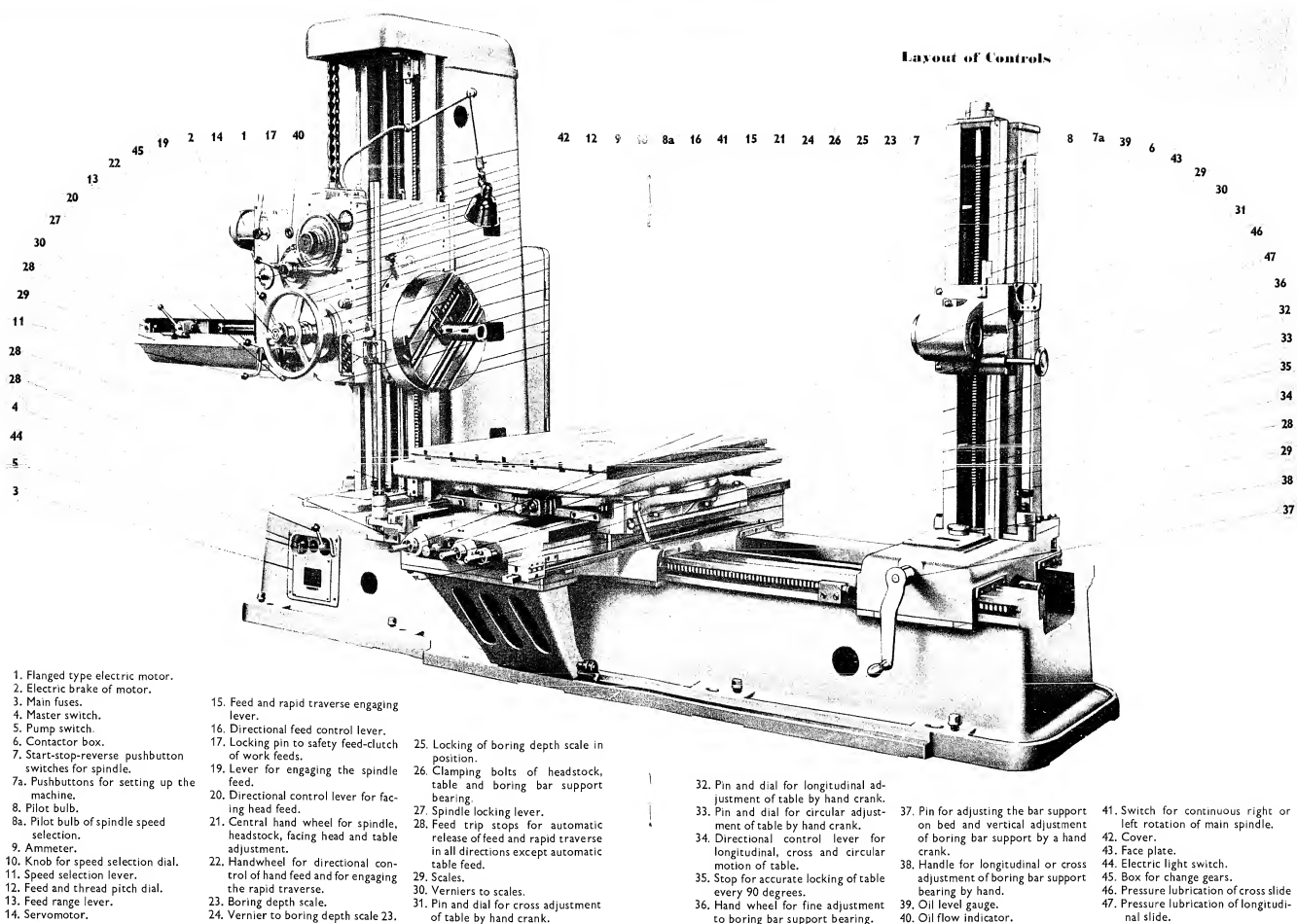
The cooling attachment is supplied as optional equipment and is necessary for the machining of steel and cast steel, and consists of an electric pump with piping. The coolant tank is provided inside the bed and is fitted with a filter.

Standard Equipment

Magnifying glass
set of spanners
grease gun
operating plates
operator's instruction booklet



Layout of Controls



1. Flanged type electric motor.
2. Electric brake of motor.
3. Main fuses.
4. Master switch.
5. Pump switch.
6. Contactor box.
7. Start-stop-reverse pushbutton switches for spindle.
- 7a. Pushbuttons for setting up the machine.
8. Pilot bulb.
- 8a. Pilot bulb of spindle speed selection.
9. Ammeter.
10. Knob for speed selection dial.
11. Speed selection lever.
12. Feed and thread pitch dial.
13. Feed range lever.
14. Servomotor.

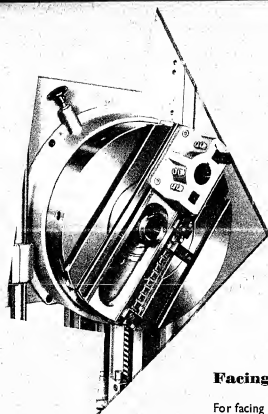
15. Feed and rapid traverse engaging lever.
16. Directional feed control lever.
17. Locking pin to safety feed-clutch of work feeds.
19. Lever for engaging the spindle feed.
20. Directional control lever for facing head feed.
21. Central hand wheel for spindle, headstock, facing head and table adjustment.
22. Handwheel for directional control of hand feed and for engaging the rapid traverse.
23. Boring depth scale.
24. Vernier to boring depth scale 23.

25. Locking of boring depth scale in position.
26. Clamping bolts of headstock, table and boring bar support bearing.
27. Spindle locking lever.
28. Feed trip stops for automatic release of feed and rapid traverse in all directions except automatic table feed.
29. Scales.
30. Verniers to scales.
31. Pin and dial for cross adjustment of table by hand crank.

32. Pin and dial for longitudinal adjustment of table by hand crank.
33. Pin and dial for circular adjustment of table by hand crank.
34. Directional control lever for longitudinal, cross and circular motion of table.
35. Stop for accurate locking of table every 90 degrees.
36. Hand wheel for fine adjustment to boring bar support bearing.

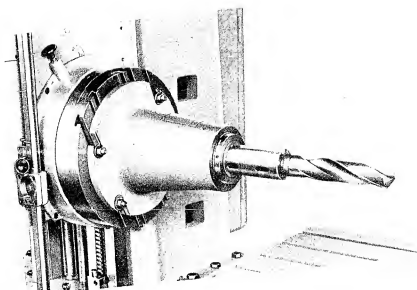
37. Pin for adjusting the bar support on bed and vertical adjustment of boring bar support by a hand crank.
38. Handle for longitudinal or cross adjustment of boring bar support bearing by hand.
39. Oil level gauge.
40. Oil flow indicator.

41. Switch for continuous right or left rotation of main spindle.
42. Cover.
43. Face plate.
44. Electric light switch.
45. Box for change gears.
46. Pressure lubrication of cross slide.
47. Pressure lubrication of longitudinal slide.



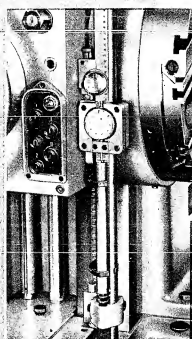
Facing Head

For facing large flanges the machines can be furnished with a facing head arranged for hand and automatic cross feed. The facing head is fitted with a tool block for holding 2 square tools and with a circular hole to receive the tool post.



Clamping and Leading Elongation Spindle Supports

Length L mm 325
Diameter D mm 250



Attachment for cross adjustment of table by means of end gauges

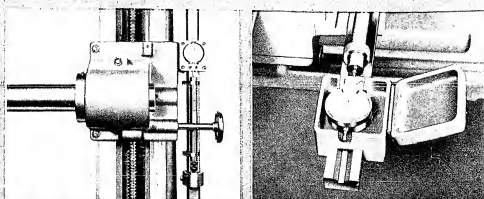
Optional Equipment

On request and at an extra charge the machines are supplied with the following attachments and optional equipment:

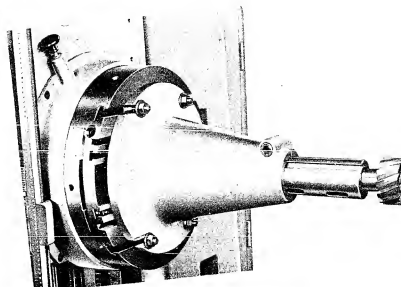
cooling attachment with electric pump, attachment for vertical adjustment of headstock by means of end gauges (without end gauges and indicator), attachment for cross adjustment of table (without end gauges and indicator), attachment for vertical adjustment of boring bar support bearing, indicator, leading elongation spindle support, clamping elongation spindle support, taper boring attachment, detachable boring attachment, telescopic tool-block, single or double-arm star feed facing head, boring bars, spot light.

Attachment for Precision Adjustment of Headstock, Table and Boring Bar Support

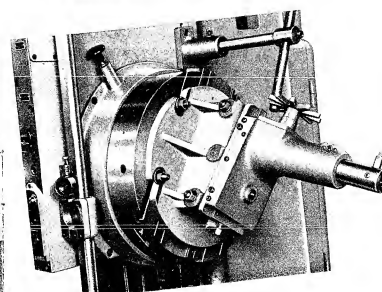
By using end gauges and the dial indicator, this attachment is fully independent of scales and verniers normally supplied with the machine, and increases the accuracy of setting up to 1/100 mm.



Attachment for vertical adjustment of headstock by means of end gauges

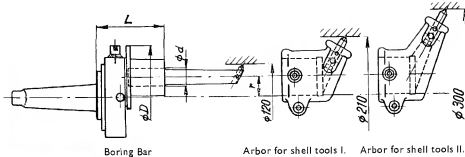
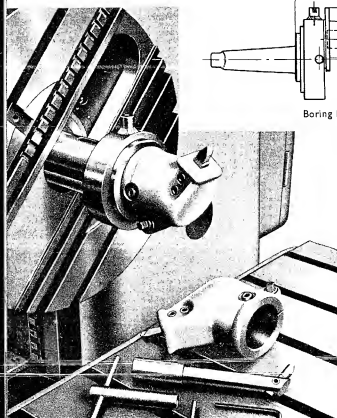


Taper Boring Attachments



Diameter of tool holder mm 50
Adjustment of tool holder mm 125
Maximum swing 15°
Length of block mm 420
Feed mm per rev. 0.1

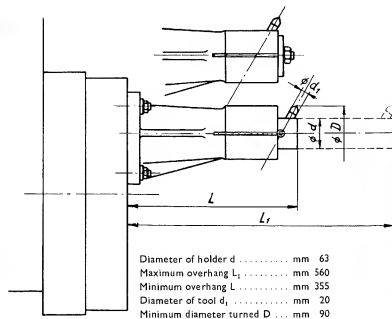
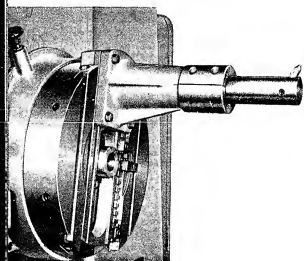
Adjustable Boring Attachments



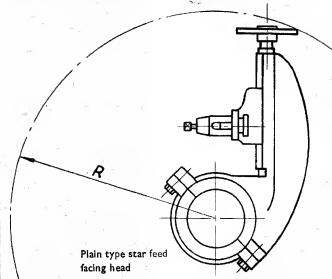
Type	PVP 80
Range of turning with boring bar	mm 35-4-120
Range of turning with arbor for shell tools I.	mm 120-4-210
Range of turning with arbor for shell tools II.	mm 210-4-300
Adjustment of bore "slide" "r"	mm 35
Diameter of tool hole in boring bar "d"	mm 30H7
Length of tool block without boring bar "L"	mm 120
Maximum Diameter with adjusted tool block "D" mm	183
Morse Taper	5

The scale enables the adjustment of tool by 0.01 mm

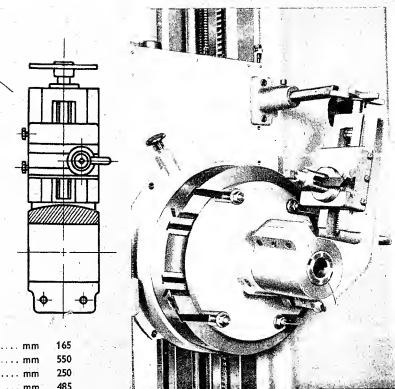
Telescopic Toolholders



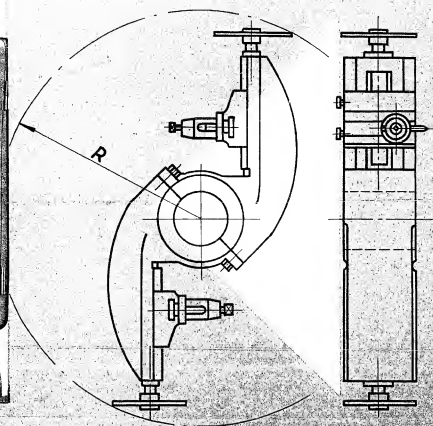
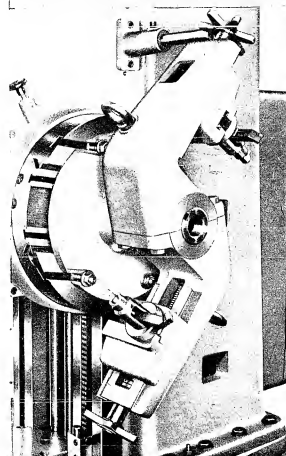
Star Feed Facing Heads



Length of hub	mm 165
Max. diameter turned	mm 550
Min. diameter turned	mm 250
Radius of circle R.	mm 485
Dimensions of tool	mm 16x25



Double type star feed facing head



Boring Bars

Normal boring bars

Type	Morse taper	D # 4	L	Dia. of spindle
VT 80	S	50	1000	80
	S	50	1600	80
	S	63	1250	80
	S	63	2000	80
	S	80	1600	80
	S	80	2500	80

Abnormal Boring bars

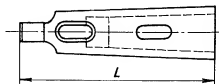
Type	Morse taper	D # 5	L	Dia. of spindle
VTA 80	S	40	1400	80
	S	40	2000	80
	S	45	1800	80
	S	50	1400	80
	S	50	2000	80
	S	55	1400	80
	S	60	1800	80
	S	60	2000	80
	S	70	2000	80
	S	70	2200	80
	S	+80	2000	80
	S	90	2500	80
	S	100	2200	80

The boring bars from dia. 80 mm upwards have the mounting f7.

When ordering, state the type of plain boring bar according to its diameter, length and taper.
Example: VTA 80 dia. 40/1400/S

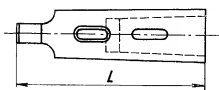
Reducing sleeves

Type	RV	RV
	80, 5/3	80, 5/4
Reduction of Morse tapers	5/3	5/4
External Morse taper	5	5
Internal Morse taper	3	4
Length L	mm 170	170



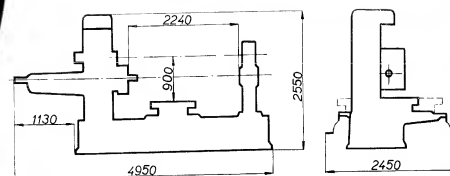
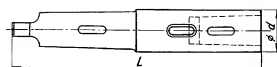
Reducing sleeves, short type

Type	RVK	RVK
	80, 5/3	80, 5/4
Reduction of Morse tapers	5/3	5/4
External Morse taper	5	5
Internal Morse taper	3	4
Length L	mm 156	162



Reducing sleeves, long type

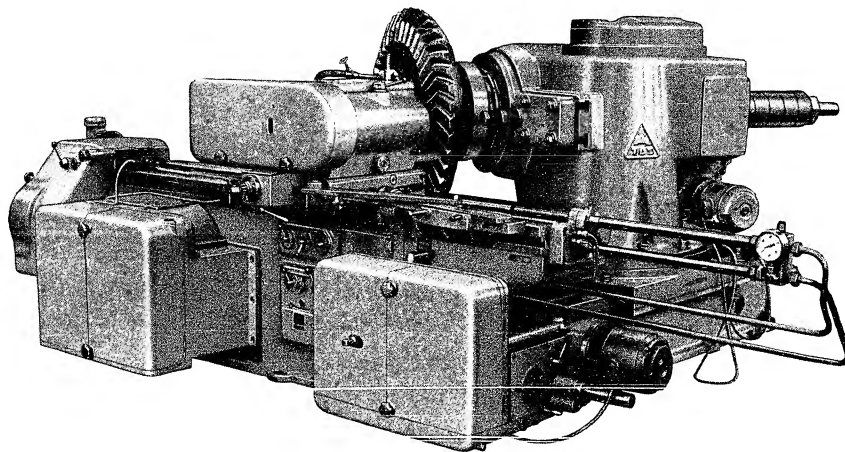
Type	RVP	RVP
	80, 5/3	80, 5/4
Reduction of Morse tapers	5/3	5/4
External Morse taper	5	5
Internal Morse taper	3	4
Total length L	mm 270	300
Diameter d	mm 38	48



GEAR CUTTING MACHINE



STAT



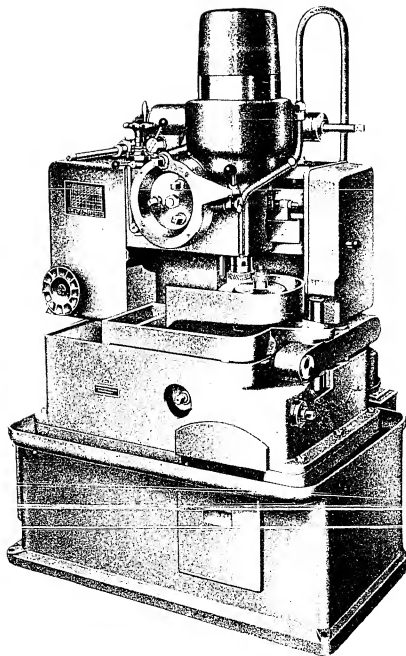
GEAR CUTTING MACHINE Type OKU 35

The machine is suitable for cutting straight, helical and herringbone teeth of both spur and bevel gears. It is particularly well suited for the cutting of herringbone gears because the gear remains undivided, without the centre gap. The gears are cut by means of simple and inexpensive shank type cutters with straight or helical cutting edges. The feed of the cutter into the cut, the rapid withdrawal of the cutter on completion of a tooth gap, the return of the headstock to its starting position and the rotation of the gear by another pitch are operated by an automatically controlled hydraulic equipment. All teeth having been cut the machine stops automatically.

Maximum diameter of spur gear being cut when clamped to front face of spindle	7'4 1/2"
Maximum width of rim of gear being cut	24 3/4"
Minimum and maximum number of teeth of gear being cut	13/140
Maximum module	35
Power of electric motor of headstock	15 HP
Weight of machine with standard equipment	19600 lbs

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GEAR SHAPERS

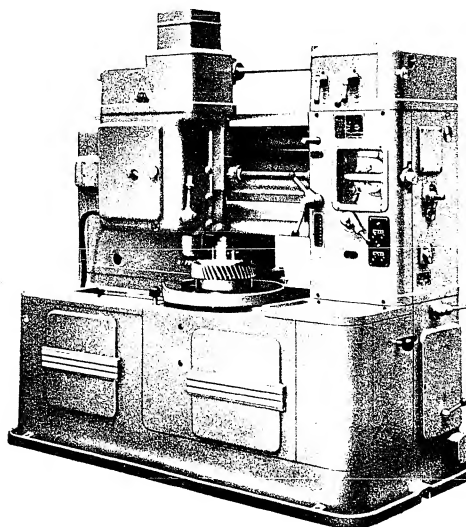


GEAR SHAPER Type OH 4

Type	OH 4		OH 6	
Maximum real module shaped	4		6	
	exter. gears	inter. gears	exter. gears	inter. gears
Maximum diameter of spur gear	7 7/8"	6 1/2"	19 1/2"	17 1/2"
Maximum diameter of helical gear . .	7 11/16"	6 1/2"	17 1/2"	16 1/2"
Maximum diameter of gear	3/8"	1 3/16"	1 31/32"	1 31/32"
Maximum width of gear	19/16"	1 13/32"	3 17/32"	3 17/32"
Range of number of tool strokes per minute . .	220 to 635		50 to 315	
Output of motor	1.2/0.75 HP		4 HP	
Floor space required . .	3'1" X 4'		3'4" X 6'11"	
Weight of machine with standard equipment	3300 lbs		5500 lbs	

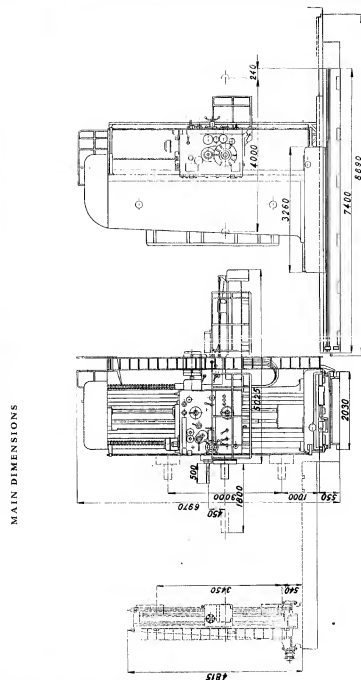
HIGH SPEED GEAR SHAPERS Types OH 4 and OH 6

The machines operate on the self-generating principle and are used for the precision shaping of spur and helical gears, both external and internal, as well as of gear sectors, gear type couplings, ratchets, cams, cam discs, polygonal holes, etc. The operation is very simple and the setting quick so that an economical production is achieved even with small quantities or single pieces.



GEAR SHAPER Type OH 6

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Specification

Diameter of main spindle	mm	300	P_{hp}^{e}
Diameters of high speed spindles	mm	80	P_{hp}^{c}
Length of main spindle	m	Metric 120	
Taper in high speed spindle		No. 5 Morse	
Maximum torque on main spindle	kgm	15000	10000 ft. lbs.
on high speed spindle	kgm	1500	1050 ft. lbs.

WORKING: RANGEN

WORKING RANGE		
Maximum diameter of boring with main spindle	mm	170.4
Maximum depth of boring with main spindle	mm	1800
Maximum depth of boring with high speed spindle	mm	500
Longitudinal sliding movement of main spindle	mm	150
Vertical movement of spindle head on column	mm	3000
Cross movement of column on bed	mm	4000

SPEEDS

SPEEDS		
Number of main spindle speeds		24
Number of high speed spindle speeds		24
Main spindle speeds	t.p.m.	84 to 180
High speed spindle speeds	t.p.m.	1.6 to 720

FEEDING

FEEDS		
32 boring feeds of main spindle	mm per rev	0.065 to 4.5 0.0025" to 0.18" per rev.
32 boring feeds of high speed spindle	mm per rev	0.016 to 1.12 0.00064" to 0.045" per rev.
16 milling feeds of spindle head and column	mm per rev	14 to 450 1/16" to 17" per rev.

RAPID TRAVERS

RAPID TRAVERSE		RAPID TRAVERSE	
Rapid traverse of main and high speed spindle approx.	1000	per min	2000
	500	per min	2000
Rapid traverse of spindle nose approx.	1000	per min	2000
	500	per min	2000

SCREWCUTTING

SCREWCUTTING			
22 metric threads with pitches of	mm	0.5 to 12	
12 Whitworth threads with	1/16 in.	28 to 1	
DRIVE			

Main motor: output speed

Main motor, output	kW	25
speed	G.p.m.	900
Motor for spindle head and column feed and for rapid traverse	kW	15
speed	I.p.m.	1400

WEIGHT OF MACHINE

with standard equipment,

with standard equipment, approx. kg 69000 132000 Ecu

STANDARD EQUIPMENT
 Complete electrical equipment of machine, high speed spindle with drive, screwcutting equipment, cooling equipment with electric motor driven pump, set of spanners for

attendance, set of machinery

SPECIAL EQUIPMENT		
BACK REST with BED		
Movement of back rest on bed	mm	1000
Vertical movement of horizon bar support on column	mm	1450
		5'11"
		17'4"

Motor for movement of c

Motor for movement of column on bed: output	kW	5.5
speed	r.p.m.	1420
Motor for movement of boring bar support on column: output	kW	1.8
speed	r.p.m.	2800
Weight of hack rest	kg	8500 18700 lbs

WHEN ORDERING, PLEASE, STATE THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS

The machines are continuously being improved upon. The particulars given in the prospectus are therefore not binding in detail.

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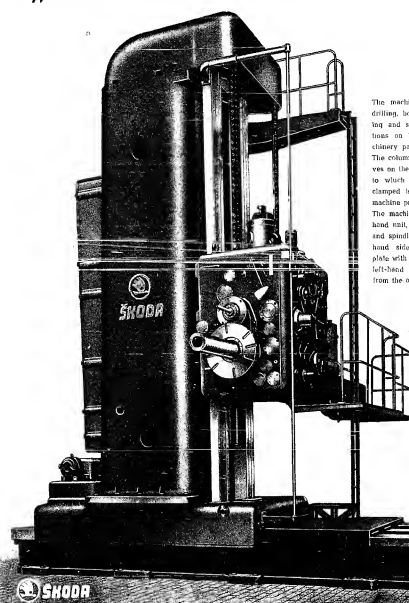
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Tested in Dichloromethane

COX 500585 n. 5586 - Km 62 - 3729-55

Type

Type *Horizontal Bed Plate Type Boring Drilling
and Milling Machine*



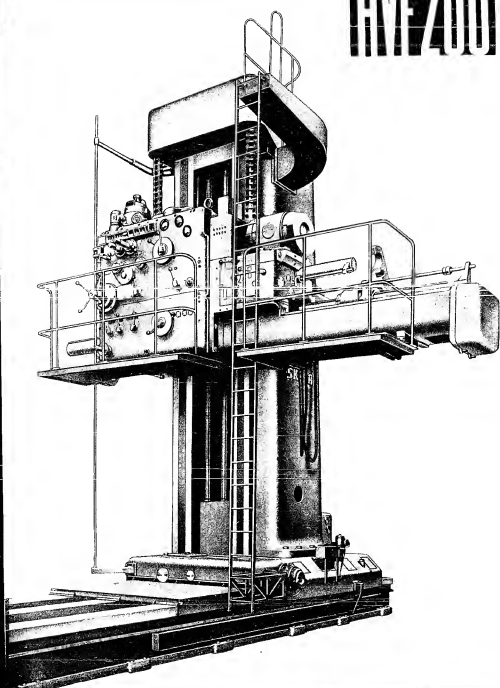
The machine is intended for drilling, boring, reaming, milling and screw cutting operations on big and heavy machinery parts.

The column of the machine moves on the bed. The large plate to which the workpieces are clamped is separate from the machine proper. The machine is built as a right-

hand unit, i.e. with the column and spindle head at the right-hand side and the clamping plate with the workplace at the left-hand side when viewed from the operator's point



HVE200



Outstanding Features

High power main motor and wide range of spindle speeds permit carbide tipped tools to be fully utilized for boring as well as for milling.

Wide range of milling as well as boring feeds permits suitable feed to be selected for variety of operations.

Electric indicator of spindle speeds allows continuous check of speed engaged. Load of main motor can be watched on ammeter. Both instruments are fitted to spindle head cover.

Spindle head and column are easy to set by means of push buttons from operator's post according to scales with verniers.

Safety clutches disengaging feed motor prevent overload of feed drive and thereby also damage to tool.

Metric and Whitworth threads of current sizes can be cut on the machine.

Central lubrication of spindle head, in which most drives are centralized with light signal indicating failures of lubricating system and pressure indication of guideways simplify operations and improve safety of operation.

High grade material of all parts and hardened and, wherever necessary, ground teeth, precision manufacture of spindles of sliding gears and spindle shafts running in anti-friction bearings and high grade workmanship of all other parts ensure lasting accuracy and high efficiency of machine.

Easy and convenient control of machine by portable push button panel controlling all motors reduces the times to minimum.

Description

THE SPINDLE HEAD is box shaped and contains the main spindle and the high speed spindle. All the drives, driving and milling feed assemblies, screw cutting equipment as well as the rapid traverse of the spindles, spindle head and column are centralized in it.

The main drive of the spindle head is powered by a reversible squirrel cage induction motor. A special brake reduces the stopping time of the machine to a minimum when the push button is depressed.

There are two kinds of feeds: boring feeds (in mm per revolution) acting upon the main as well as the high speed spindle, and milling feeds (in mm per min.) moving the spindle head vertically

on the column and the column across the bed. Both kinds of feed are variable within a wide range and arranged in fine steps.

The main spindle is carried in a sleeve with an adjustable tapered bush by which the spindle can be firmly gripped. The front end of this sleeve has a flange to which milling cutters can be fitted and is carried in a tapered bush with an expanding wedge for accurate adjustment of the bearing play. The thrust is borne by the rear bush provided with thrusts by which the spindle sleeve with the flange can be moved outward longitudinally by means of a worm gear.

The multi-plate clutches are operated by a push button controlled electric motor. To the right-hand side of the spindle head an arm is fitted with a guide for the driver bearing of the main spindle.

All parts inside the spindle head are splash lubricated. The oil is circulated by a gear type oil pump driven by its own electric motor.

THE HIGH SPEED SPINDLE has a particularly high speed (720 r.p.m. maximum) which permits inserted carbide tipped tools to be fully utilized at smaller boring diameters. It runs in an accurate, finely adjustable bearing.

THE SCREW CUTTING EQUIPMENT for screwing the spindle has a tooling movement operated by a lead screw driven off the spindle through a gear box with change gears arranged in a gear quadrant. A set of 17 change gears allows the cutting of 22 sizes of metric threads with a pitch from 0.5 to 12 mm or 32 Whitworth threads with 28 to 1 thread per inch.

THE COLUMN is well reinforced with ribs and rests on a large seating area on the base which moves along the bed. It encloses the counterweight of the spindle head.

THE BED is of ample width and reinforced with ribs. The large guiding surfaces allow perfect guiding and a firm base for the column even with the heaviest loads.

COOLING The machine is provided with a cooling system consisting of a tank arranged, as a rule, separate from the machine, an electric motor driven pump and piping.

THE CONTROLS of the machine are simple and conveniently laid out. The control of all the motors is centralized, on the one hand, on the spindle head cover, on the other hand on a portable push button panel. This arrangement permits the operator to control most of the movements of the machine directly from his post.

To facilitate changes of tools, adjustments, etc., a special inching push button is provided on the spindle head by means of which the machine is started and only kept running as long as the push button is being held depressed.

THE BACK REST, which is only supplied to order as special equipment, consists of a short bed and a column with the boring bar support. The column of the support moves crosswise on its bed (perpendicularity to the centre line of the main spindle).

TYPE HVF 160 D HORIZONTAL BED PLATE BORING DRILLING AND MILLING MACHINE

The machine is intended for drilling, boring, reaming, milling and screwcutting. It is particularly well-suited for work on big and heavy objects. These are clamped to a plate separate from the machine proper. The machine is built as a right-hand unit, i. e. with the column and spindle head at the right-hand side and the clamping plate with the workpiece at the left-hand side when viewed from the operator's post. By fitting a lifting shackle to the column the machine can be converted to the portable type because the unit proper, i. e. the column, spindle head and bed are not attached to the bed plate.

OUTSTANDING FEATURES

HIGH POWER MAIN MOTOR

WIDE RANGE OF SPEEDS of spindle, which runs in special adjustable anti-friction bearings, permits cemented carbide tipped tools to be fully utilized for boring as well as for milling.

ELECTRIC SPEED INDICATOR of spindle as well as of face plate.

INDEPENDENT SPINDLE AND FACE PLATE DRIVE affording most varied combinations of operations.

FACE PLATE WITH SLIDE for automatic facing provided with a small axial movement for adjustment of tool into the cut (in case a milling cutter is fitted to face plate).

CUTTING OF THREADS, metric as well as Whitworth, with current pitches.

ACCURATE SETTING of spindle, spindle head or column by means of precision gauges with verniers or by dial-type error gauges.

FEEDS AND RAPID TRAVERSES of all parts of machine can be disengaged by limit switches except for boring feed of spindle which can be limited by adjustable stops.

ALL DRIVE AND FEED SHAFTS running in anti-friction bearings.

CLEAR LAYOUT OF CONTROLS OF WHOLE MACHINE and convenient remote control of main motor by electric push-buttons from any position.

DESCRIPTION

THE DRIVE. The machine is driven by a flange-mounted reversible squirrel cage electric motor provided with an "Alnico" brake outfit. The load of the motor can be checked by means of an ammeter fitted to the spindle head.

THE SPINDLE HEAD is designed as a self-contained assembly with its own electric motor and complete drive of the spindle and face plate and of the feeds and rapid traverses. The speeds and feeds are changed by means of gears sliding on spline shafts running in anti-friction bearings throughout. The gears are hardened and those with higher peripheral speeds are ground.

A setting of the height of the spindle on the column, accurate within 0.05 mm (0.002") can be made by means of the vernier on the scale. Even more accurate settings are possible with the help of the dial-type error gauge.

THE SPINDLE runs in a special, double-row, finely adjustable roller bearing. The hollow spindle is carried in an adjustable tapered bush. The spindle and face plate can run mutually entirely independently, i. e. they either run both at the same low speed or the spindle runs 16 times as fast as the face plate. This combination can be used to advantage for simultaneous boring by means of the spindle and machining of flanges by means of the face plate slide. The speeds of both spindles are indicated by an electric speed indicator.

THE FACE PLATE is keyed to a hollow spindle and provided with a slide for facing which moves independently of the spindle in either direction. The slide has its own rapid traverse, the extreme positions being limited by positive stops, the drive being protected against damage by a safety clutch.

The milling tools having been set in relation to the workpiece the face plate can be moved, by hand or power, about 50 mm (2") outward. The drive is protected in its extreme positions by a shear wedge.

THE FEEDS. There are two kinds of feeds: Boring feeds (in mm per revolution) acting upon the main spindle and face plate slide and milling feeds (in mm per minute) moving the spindle head vertically on the column and the column longitudinally on the bed. The main spindle feed can be limited by adjustable stops. The direction of feed of the face plate slide is independent of the direction of rotation of the spindle.

SCREWCUTTING. 22 metric and 32 Whitworth threads with current pitches can be cut on the machine. The feeding movement of the spindle is operated by a lead screw driven off the spindle through a gear box with change gears.

THE COLUMN is reinforced with densely spaced ribs. It encloses the counterweight of the spindle head. In the rear part of the column the easily accessible electrical equipment cabinet is fitted and also the box with change gears for screwcutting. The bottom part of the column rests on the bed on large guiding surfaces. The column is moved along the bed by means of a pinion and rack.

THE BED. The large guiding surfaces of the bed afford perfect guiding for the column even under the heaviest loads.

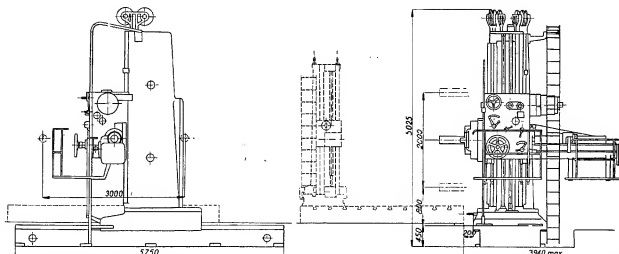
THE LUBRICATION of the spindle head is a central splash lubrication with the oil being circulated by a gear type pump. The operation of the pump is checked by a lubrication guard with a signal light. The column on the bed and the guideways of the spindle head are also centrally pressure lubricated by means of a hand-operated lubricator. The mechanism in the bottom part of the column is lubricated by an oil bath.

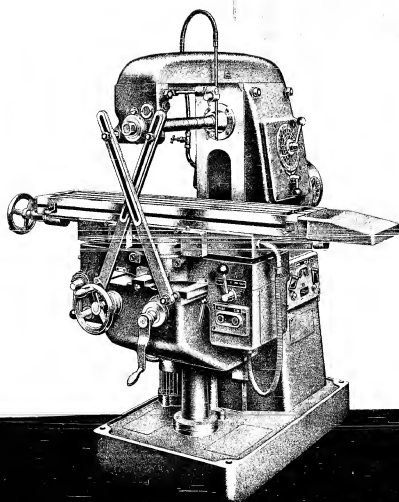
THE COOLING SYSTEM is a circulating system with a coolant tank arranged in the bed. The coolant is circulated by an electric motor driven centrifugal pump.

THE BACK REST is supplied only to special order. The boring bar support is moved on the column of the back rest mechanically by an independent electric motor or by hand by a hand wheel by means of which it can be accurately aligned with the spindle with the help of the vernier on the scale or a spirit level.

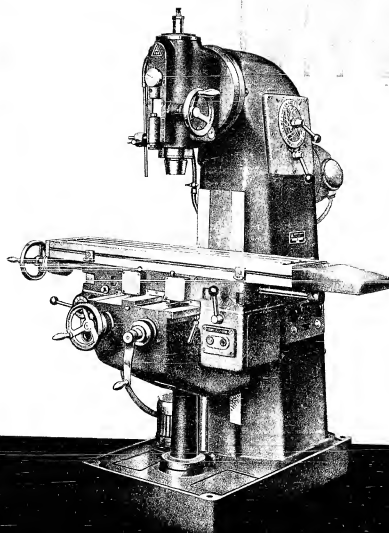
THE CONTROLS of the machine are simple and conveniently laid out. The main motor is controlled by electric push-buttons fitted on the spindle head and also on a portable hook-on box. To facilitate changes of tools, adjustments and the sliding of gears a special electrical push-button is provided on the spindle head by means of which the machine is started and kept running only as long as the push-button is being held depressed.

The controls of the clutches, of the engagement of speeds and feeds as well as the controls of all hand and power feeds of the spindle, face plate, face plate slide, spindle head or column are suitably centralized on the spindle head and marked by appropriate plates and tables, which are easy to read.

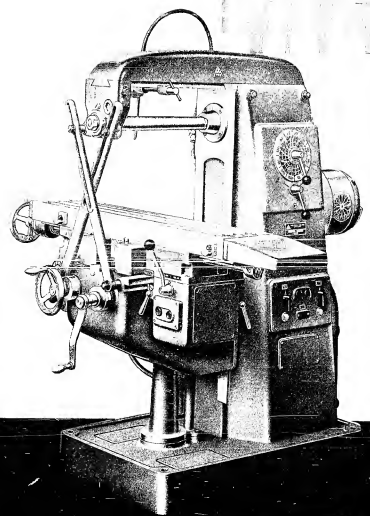




UNIVERSAL MILLING MACHINE Model FA2U



VERTICAL MILLING MACHINE Model FA2V



PLAIN MILLING MACHINE Model FA2H



SPECIFICATIONS

Table: Working surface: width	mm	200
Length	mm	1000
Number of T-Slots	mm	14 x 42
Width distance of T-Slots	mm	440
Longitudinal travel: by hand	mm	400
by power	mm	375
Vertical movement: by hand	mm	44
by power	mm	35
Spindle: standard taper hole	mm	15A
On demand metric	mm	3
Motor	mm	35
Distance from centerline of spindle to top of table: maximum	mm	400
Minimum	mm	25
Distance from centerline of spindle to top of table: maximum	mm	345
Minimum	mm	110
Distance from spindle nose to inside of arbor support	mm	400
Distance from centerline of arbor to underside of overarm	mm	110
Distance from column to brace	mm	12
Spindle speed: number	r.p.m.	43-2700
standard series	r.p.m.	90-4000
high series	r.p.m.	13
Longitudinal table feed: Number	mm/min	14-900
Range	mm/min	2800
Power rapid traverse: Longitudinal	mm/min	1400
Drive: Main motor: Speed	r.p.m.	3.35
Feed	mm	2770
Feed motor: Speed	r.p.m.	6.7
Feed	mm	1385 x 2150
Shipping size: Floor space required	mm	450
Weight of machine: with standard equipment	kg	1100
with assembly packing	kg	140 x 140 x 140
Size of case	mm	3.1

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operator's instruction booklet.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

SPECIFICATIONS

Table: Working surface: width	mm	200
Length	mm	1000
Number of T-Slots	mm	3
Width distance of T-Slots	mm	14 x 42
Longitudinal travel: by hand	mm	400
by power	mm	375
Vertical movement: by hand	mm	44
by power	mm	35
Spindle: standard taper hole	mm	15A
On demand metric	mm	3
Motor	mm	35
Distance from centerline of spindle to top of table: maximum	mm	400
Minimum	mm	25
Distance from centerline of spindle to top of table: maximum	mm	345
Minimum	mm	110
Distance from spindle nose to inside of arbor support	mm	400
Distance from centerline of arbor to underside of overarm	mm	110
Distance from column to brace	mm	12
Spindle speed: number	r.p.m.	43-2700
standard series	r.p.m.	90-4000
high series	r.p.m.	13
Longitudinal table feed: Number	mm/min	14-900
Range	mm/min	2800
Power rapid traverse: Longitudinal	mm/min	1400
Drive: Main motor: Speed	r.p.m.	3.35
Feed	mm	2770
Feed motor: Speed	r.p.m.	6.7
Feed	mm	1385 x 2150
Shipping size: Floor space required	mm	450
Weight of machine: with standard equipment	kg	1100
with assembly packing	kg	140 x 140 x 140
Size of case	mm	3.1

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operator's instruction booklet.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

SPECIFICATIONS

Table: Working surface: width	mm	200
Length	mm	1000
Number of T-Slots	mm	3
Width distance of T-Slots	mm	14 x 42
Longitudinal travel: by hand	mm	400
by power	mm	375
Vertical movement: by hand	mm	44
by power	mm	35
Spindle: standard taper hole	mm	15A
On demand metric	mm	3
Motor	mm	35
Distance from centerline of spindle to top of table: maximum	mm	400
Minimum	mm	25
Distance from centerline of spindle to top of table: maximum	mm	345
Minimum	mm	110
Distance from spindle nose to inside of arbor support	mm	400
Distance from centerline of arbor to underside of overarm	mm	110
Distance from column to brace	mm	12
Spindle speed: number	r.p.m.	43-2700
standard series	r.p.m.	90-4000
high series	r.p.m.	13
Longitudinal table feed: Number	mm/min	14-900
Range	mm/min	2800
Power rapid traverse: Longitudinal	mm/min	1400
Drive: Main motor: Speed	r.p.m.	3.35
Feed	mm	2770
Feed motor: Speed	r.p.m.	6.7
Feed	mm	1385 x 2150
Shipping size: Floor space required	mm	450
Weight of machine: with standard equipment	kg	1100
with assembly packing	kg	140 x 140 x 140
Size of case	mm	3.1

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operator's instruction booklet.

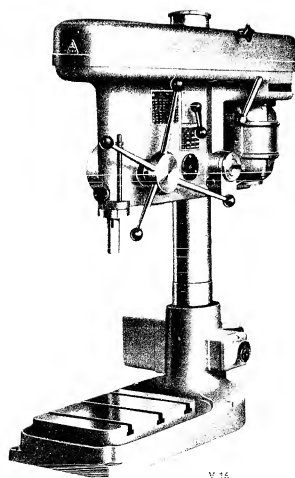
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IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

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V 16

DRILLING MACHINES V 16, VS 16

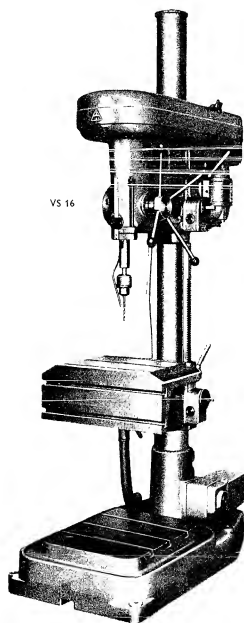
These machines are made in two styles: the Table Type V 16 and the Column Type VS 16.

They are driven by an individual electric motor with an output of 0.8-1.1 HP. This output and the torque on spindle of 200 kgcm refer to the values of drilling in alloy steel 100 kg/mm² tensile with a high speed steel drill up to dia. 16 mm. The spindle speed range of 355 to 2800 r. p. m. in 8 speeds enables economical drilling of holes dia. 3 to 16 mm in all commonly used materials. This range consists of two speed bands each having 4 speeds:

Speed band I ranging from 355 to 1400 r. p. m.
Speed band II ranging from 710 to 2800 r. p. m.

THE HEADSTOCK is vertically adjustable and may be swivelled on the column. The speeds are changed by shifting the belt on the 4-step pulleys, after having removed the headstock cover. The spindle is driven by a V-belt with provision of tension adjustment. The speed bands are changed by the switch of the main drive motor which also serves for starting and stopping the motor. The spindle is fed by hand.

The drilling depth is adjusted on a millimetre scale. The spindle rotates in precision ball bearings and is returned to its upper position by a spring. The headstock is lubricated from pressure oilers. The lubrication of the spindle bearings is done while the machine is at rest, by pouring the oil into the groove of the hub of the driven pulley.



VS 16

SLOTING MACHINE

MODEL HOV 16

This machine is intended for smaller work-shops with single part or series production. Its outstanding features are great output, as well as high precision and cleanliness of work. All controls are centralized to be easily accessible from the operator's position.

THE COLUMN is of the box-type and has a sturdy construction which is adequately ribbed. At the bottom of its front side it has the prismatic guides for the knee and at the top the surface for the ram-ways.

THE DRIVE is by V-belts from the motor mounted on a hinged plate inside the lower part of the column, through a multi-plate clutch to the reduction gearing in the upper part of the column, whence the power is transmitted by an eccentric to the ram. For correct belt tension adjustment the hinged plate is swung down. The desired number of up and down strokes is set by shifting the reduction gears with the aid of a lever arranged on the right-hand side of the column. The machine is started by a multiple disc clutch and stopped by a multi-plate brake enabling the instant stopping of the ram in any position. The clutch and the brake are adjustable and after removing the cover on the left-hand side of the column they are easily accessible. Three ram speeds are available.

THE RAM made of cast steel is flat and of rigid construction. The play in the guides of the ram which may be swung up to 5 deg. in both directions, is eliminated by a taper gib. The tool lifter operates automatically.

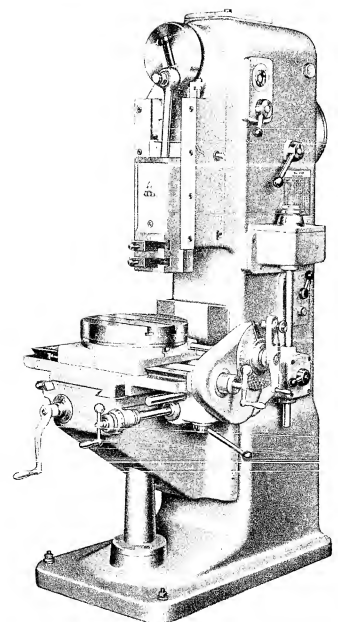
THE FEED ATTACHMENT is located on the right-hand side of the column. The feed is infinitely variable within a range of 0.1—0.6 mm per double stroke, both with the machine running and at rest. The feed rate is read on a dial provided on the feed box.

The table is of the circular type and has three parallel T-slots. In its centre it has a centering taper hole for circular cutting. Its circumference is divided into 360 divisions. For accurate setting of any number of divisions (as per the table) a special dividing attachment for indirect indexing is provided.

THE TABLE FEED is longitudinal, cross or circular and proceeds either by hand or automatically. A safety clutch protects the table from overload.

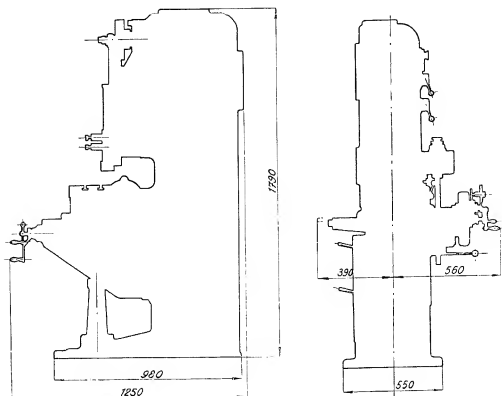
THE LUBRICATION of the driving mechanism and of the ram is automatic by the central system. An oil pump supplies the oil through a filter to the tank whence it is distributed to all individual oiling points. Correct function of the pump may be watched in the sight windows.

STANDARD EQUIPMENT: 2 tool boxes, tool box with tool lifter, set of spanners, 3 V-belts and motor pulley, electrical equipment including motor with hinged plate, indexing attachment, operating instruction booklet.



SPECIFICATION

	Metric	English
Maximum height of stroke	160	6.3"
Diameter of circular table	320	12.6"
Width distance between T-slots	mm	14/80
Vertical travel of table	270	10.6"
Cross travel of table	320	12.6"
Longitudinal travel of table	200	7.8"
Distance, tool edge to column	265	10.4"
Distance, tool edge to ram guide	100	3.94"
Distance, clamping surface of table to lower end of ram guide	270	10.6"
Maximum distance, tool to clamping surface of table	280	11"
Ram guide swivels in both directions	5°	5 deg.
Number of speeds	3	3
Number of up and down strokes per minute	71—112—180	71—112—180
Maximum pulling power	kgs 350	lbs 770
Feeds, infinitely variable: longitudinal feeds, ranging from	mm 0.1—0.6	0.004"—0.0236"
cross feeds, ranging from	mm 0.1—0.6	0.004"—0.0236"
Main drive motor: Speed	r. p. m. 1400	1400
Output	HP 2.04	2.04
Floor space required (width×length)	mm 930×1200	37"×47"
Weight of machine: with standard equipment	kgs 1050	lbs 2320
with railway packing	kgs 1100	lbs 2420
with seaway packing	kgs 1300	lbs 2860



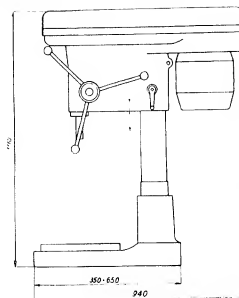
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IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

Printed in Czechoslovakia - ZMT 03 Vyškov 1937/54

ČOK 52919 a - 5412



The Table of the VS16 machine is of the angular type with horizontal and vertical clamping surfaces. It enables the clamping of long parts to be bored in the direction of their axes. The table rests on a bracket which is vertically adjustable and swivels on the column.

Standard Equipment: Electric motor to suit three-phase current 380 volts 50 cycles (motor for another voltage and phase is supplied only on special order and at an extra charge) with switch, V-belt, cooling equipment, crank for lifting headstock and table, ejector.

SPECIFICATION

Type	Table	Type V 16	Column	Type VS 16
Drilling diameter	16	5/8"	16	5/8"
Drilling depth	125	4 7/8"	125	4 7/8"
Taper in spindle	2	2	2	2
Clamping surface of base plate	280×355	11"×14"	356×450	14"×17 3/4"
Clamping surface of angular table: horizontal surface			280×350	11"×13 3/4"
vertical surface			180×460	7 1/8"×18"
Distance, end of spindle to clamping surface of base plate:				
maximum	450	14"	1120	44"
minimum	150	5 7/8"	785	31"
Distance, end of spindle to clamping surface of angular table:				
maximum			640	25 3/8"
minimum			0	0
Distance, centre line of spindle to centre line of column	325	12 3/4"	325	12 3/4"
Vertical motion of headstock	300	11 7/8"	335	13 1/4"
Vertical motion of bracket with table			410	16 1/4"
Spindle speeds:				
Speed band I ranging from	355—1400		355—1400	
Speed band II ranging from	710—2800		710—2800	
Maximum torque on spindle	200	173 lbs. in	200	173 lbs. in
Main drive motor: Speed	700—1400		700—1400	
Output	0.8/1.1		0.8/1.1	
Floor space required	965×480	38"×18 3/4"	530×1030	21"×40 1/2"
Weight of machine:				
with standard equipment	295	650 lbs	450	1000 lbs
packed for rail	350	770 lbs	510	1120 lbs
packed for overseas	370	820 lbs	540	1200 lbs

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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ČOK 52683a 5412

HD16,

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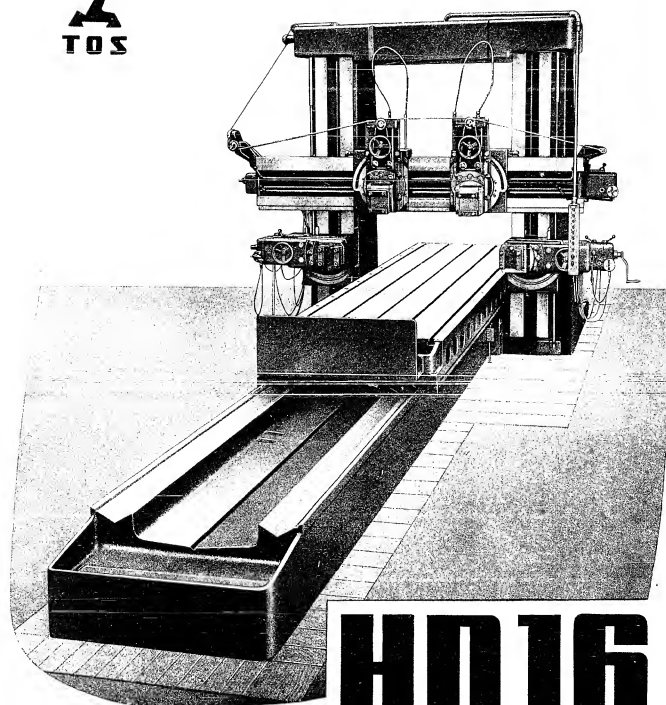
SPECIFICATION

	TYPE HD 16	TYPE HD 20 A
Planing width	mm 1600 (63")	mm 2000 (78.7")
Planing length	mm 4000 to 12000	mm (13 to 40 feet)
Planing height	mm 1600 (63")	mm 2000 (78.7")
Clamping surface of table (width x length)	mm 1400 x 4000 x 12000 (55" x 13'—39.4')	mm 1800—4000 x 12000 (71" x 13'—39.4')
Vertical movement of toolhead slide	mm 350 (13.8")	
Number of cutting and return speeds	Infinitely variable adjustment	
Model 1.		
Range of cutting and return speeds, approx. metres per min.	3—5 to 50 feet p/min. 10—16 to 164 feet p/min.	
Maximum drawing force	kg 9500 (20900 lb.)	
Input power of motor	HP 60	
Model 2.		
Range of cutting and return speeds, approx. metres per min.	3—6.3 to 63 feet p/min. 10—21 to 207 feet p/min.	
Maximum drawing force	kg 8000 (17600 lb.)	
Input power of motor	HP 60	
Model 3.		
Range of cutting and return speeds, approx. metres per min.	3—8 to 80 feet p/min. 10—26 to 263 feet p/min.	
Maximum drawing force	kg 6300 (13900 lb.)	
Input power of motor	HP 60	
Tool head feeds	mm 0.25 to 20 0.01" to 0.8" per stroke	
Tool slide feeds	mm 0.125 to 10 0.005" to 0.4" per stroke	
Maximum load of table by workpiece		
per 1 metre of planing length	kg 2000	
per 1 foot of planing length	lb. 1340	
Maximum load of 1 foot head	kg 5500 (12125 lb.)	
Input power of motor for rapid traverse of crossrail	HP 4	
Input power of motor for rapid traverse of tool heads	HP 1.5	
Weight of machine with standard equipment		
(4000 mm = 13 ft. planing length) approx.	kg 37000 (81600 lb.)	kg 43000 (95000 lb.)
Weight per 1 metre of planing length approx.	kg 3500	kg 4500
Weight per 1 foot of planing length approx.	lb. 2350	lb. 3020
Weight of machine with seaworthy packing		
(4000 mm = 13 ft. planing length) approx.	kg 47000 (103600 lb.)	kg 53000 (116844 lb.)
Weight with seaworthy packing		
per extra metre of planing length approx.	kg 4100	kg 5100
per extra foot of planing length approx.	lb. 2760	lb. 3450

WHEN ORDERING, SPECIFY PLANING LENGTH, TABLE SPEED, VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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DOUBLE HOUSING PLANING MACHINES

are High Speed, Heavy Duty Machines of particularly rigid design which ensure a high grade of the machined surfaces even for the heaviest operations. The precise workmanship of the machines guarantees that the machined surfaces are precisely parallel and accurate within 0.01 mm per 1 metre of planed length. The high capacity of the machine allows cemented carbide tipped tools to be used, particularly for the machining of cast iron.

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TYPES HD 16 AND HD 20A DOUBLE HOUSING PLANING MACHINES

are manufactured in two sizes, one with a planing width and height of 1600 mm (64") designated the HD 16, and the second with a planing width and height of 2000 mm (80") designated the HD 20A. Both sizes are available for various planing lengths of from 4000 to 12 000 m (13' to 40'). Machines built for a longer planing length permit several large objects to be machined simultaneously when clamped to the table in succession, which considerably cuts down the average working time necessary for the machining of one piece.

The machines are supplied in three models having different maximum table speeds with an upper limit of 50, 63 or 80 metres (164, 207 or 263 feet) per minute.

The machines are normally equipped with two rail heads on the crossrail and a right-hand sidehead. They can also be supplied to special order with a left-hand sidehead. Outstanding features common to all models are the easy way of setting up the machines for any required job and ease of operation, rendering the machines economical both in single part manufacture and quantity production.

DESCRIPTION

The Bed consists of three parts: the longest central part and two end extensions. It is of a rigid lattice design, provided with heavy ribs and reinforced in the centre. The two prismatic guideways for the table are planed, ground and scraped if necessary.

The Table Drive. For the drive of the table a Ward-Leonard control is used with an infinitely variable speed regulation within a range of 1:10. This control system consists of a motor-generator for the generation of direct current, an exciter set and a variable speed motor coupled to the driving mechanism of the table by means of a flexible coupling. This arrangement affords infinitely variable regulation of the motor speed and, with it, of the table speed as well as a reversal of the table in its end positions. This arrangement considerably reduces working times as compared to older methods of reversing drives with clutches.

The central box-shaped part contains the main driving mechanism of the table. The gears for the transmission of motion to the rack of the table have helical teeth and ensure a smooth transmission of power. They are made of high-grade steel and cast steel. Gears for higher peripheral speeds are ground.

The Table. The cast iron table, which is heavily reinforced with ribs and of rigid construction, consists, in cases of greater planing lengths, of two parts. The upper surface of the table has T-slots for clamping and holes for stops. The guideways of the table are lined with an artificial layer-forming material which protects them against seizing and substantially reduces wear of the bed. Oil wipers are arranged at either end of the table. A knife-type brake prevents the table from moving beyond the limits corresponding to the maximum travel and thus it increases the safety of the machine in operation.

The Housings are bolted to the table and form, together with the cross member, a perfectly rigid frame. The large cross section of the housings and the ribs arranged inside ensure smooth action and reduce vibrations to a minimum. At the front of the housings are the guides for the crossrail and for the sideheads. On the inner sides of the housings guideways are arranged for clamping the crossrail in position.

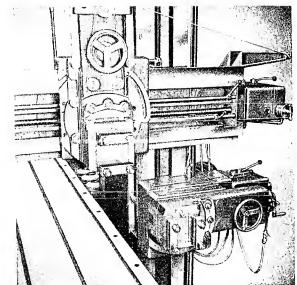
The Cross Member, which is of generous dimensions and reinforced with ribs, is fitted to the top seating surfaces of the housings. It joins the housings very rigidly and prevents them from being distorted by the cutting resistances transferred to them by the sideheads and crossrail.

The Crossrail is designed as a single heavy unit, the front part of which is provided with guideways for the rail heads. The rear part is generously reinforced with ribs, which reduces distortions due to the cutting resistance to a minimum. The crossrail is automatically clamped to the housings by means of a hydraulic device arranged in the centre at the rear of the crossrail. Thus the cutting resistance is transmitted to the housings. The crossrail is vertically adjusted by means of a push button controlled rapid traverse.

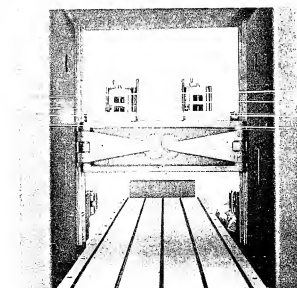
The Rail-heads on the crossrail and the sideheads have hand and power feed and rapid traverse in horizontal and vertical direction. The sideheads (the left-hand one of which is only supplied to special order against extra charge) have their own feed-box. The tool head slides can be swivelled from their neutral positions through as much as 60° either way. The rail-head slides on the crossrail are balanced by means of a counterweight and a system of pulleys. This facilitates their adjustment by hand. The lifting of the tool-boxes is effected automatically hydraulically. The hydraulic feeds have two ranges with an infinitely variable adjustment, the ranges being 0 to 4 mm (5/32") and 0 to 22 mm (25/32") respectively per stroke of the table. Both rail heads on the crossrail and both sideheads can either be operated independently or simultaneously. This second possibility contributes chiefly to a substantial reduction of machining times and eliminates frequent clamping of the machined part.

The Feed Boxes are fitted at the right-hand side of the crossrail and on each sidehead. Each feed box contains a hydraulic feed cylinder and a motor for the rapid traverse. The direction of the rapid traverse is the same as that of the power feed. The gears of the feed box run in an oil bath.

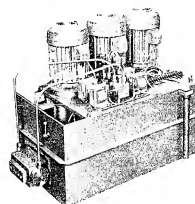
Lubrication. The table guideways are lubricated by an individual oil pump provided with an adjustment for oil pressure.



View of sidehead



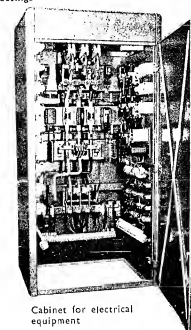
Rear view of crossrail. Hydraulic clamping of crossrail on housings



Pump of hydraulic system



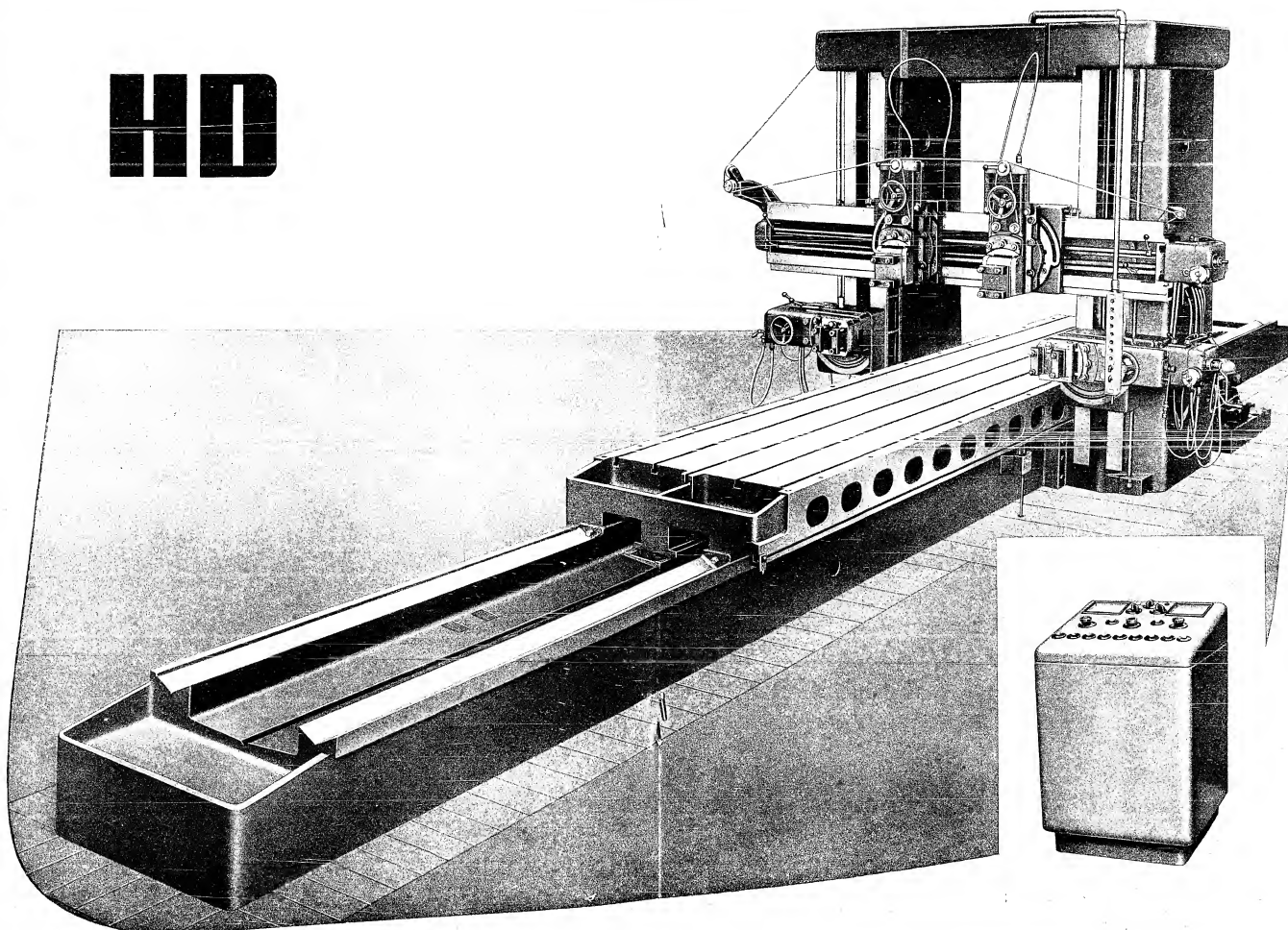
Control desk



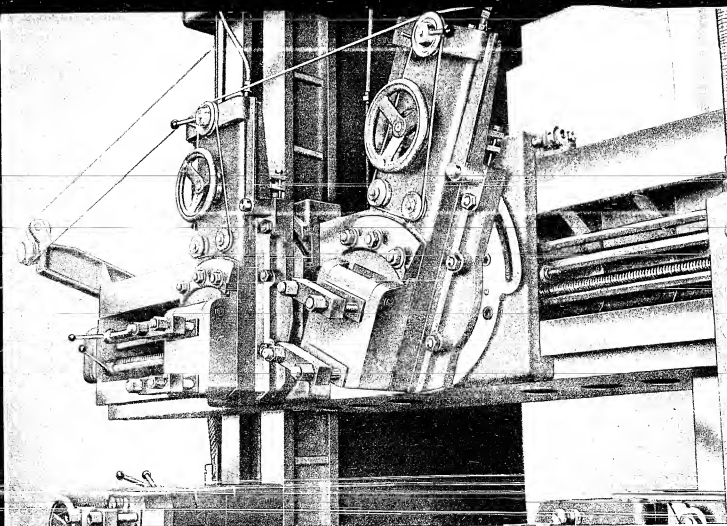
Cabinet for electrical equipment

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HD

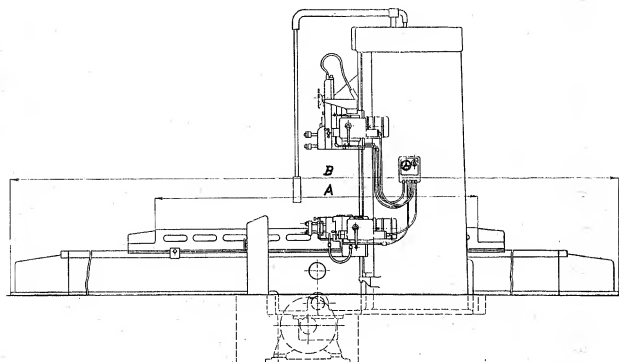


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View of crossrail. One railhead is tilted

Dimensional drawing



Oil running off the guideways collects on the top surface of the bed and drains into sumps in the extensions at either end of the bed, and from there into the tank in the central box-shaped part of the bed, whence it is drawn by the pump, and once more delivered through a lamination type filter to the bedways. The gears of the table drive are also lubricated by an oil pump of their own. The railheads on the crossrail and also the sideheads are lubricated with oil flowing by means of gravity or of wicks from oil containers.

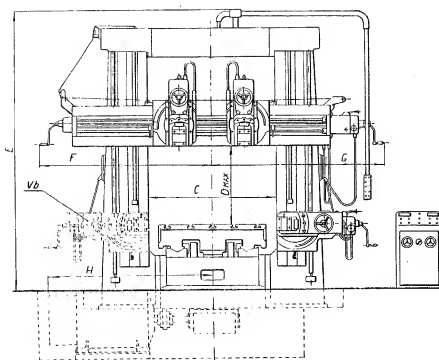
Operation. All movements of the tool heads and crossrail are remote controlled by means of push buttons from a portable hook-on control box as well as from the control desk. When the rapid traverse of the crossrail is engaged the crossrail is automatically unclamped, and when the rapid traverse is stopped, it is automatically clamped again.

When the machined part is being clamped to the table, the starting push-buttons can be locked from the control desk to prevent the table from being started by oversight.

Standard Equipment. Two railheads on the crossrail, one right-hand sidehead, drive by means of Ward-Leonard set consisting of main electric motor, D. C. generator directly coupled to three phase clipping electric motor for connection to the power mains, oil immersed rotor starter, controlling elements including exciter (amplidyne), protective switch, distribution box, control desk and portable hook-on control box, spanners and operation instruction booklet.

Optional Equipment. Left-hand sidehead with automatic cool-lifter and hydraulic mechanism.

	A	B	C	D	E	F	G	H
HD 16	4000-12000	10260-26260	1600	1600	3800	2150	2100	2150
HD 20	4000-12000	10260-26260	2000	2000	4200	2350	2300	2150



HD12

SPECIFICATION:

Planing width	mm	1250	50"
Planing length	mm	3000 to 12.000	10 to 40 feet
Planing height	mm	1250	50"
Clamping surface of table (width x length)	mm	1100 X 3000—12.000	44" X 10'—40'
Vertical movement of tool slide	mm	250	10"
Number of cutting and return speeds			Infinitely variable

MODEL 1:

Range of cutting and return speeds, approx. metres per min.		3—5 to 50	10—16 to 164 feet per min.
Maximum drawing force	kg	10000	22000 lbs
Input power of motor	HP		60

MODEL 2:

Range of cutting and return speeds, approx. metres per min.		3—6.3 to 63	10—21 to 207 feet per min.
Maximum drawing force	kg	8000	17600 lbs
Input power of motor	HP		60

MODEL 3:

Range of cutting and return speeds, approx. metres per min.		3—8 to 80	10—26 to 263 feet per min.
Maximum drawing force	kg	6300	13900 lbs
Input power of motor	HP	60	
Carriage feeds	mm per stroke	0.25 to 20	0.01" to 0.8" per stroke
Tool slide feeds	mm per stroke	0.125 to 20	0.005" to 0.4" per stroke
Input power of rapid traverse motor of cross rail	HP	3	
Input power of rapid traverse motor of heads	HP	1	
Maximum loading of table by workpiece per metre of planing length	kg	1000	2200 lbs
Maximum load per head	kg	3500	7700 lbs
Weight of machine with standard accessories (1100 mm—9'10" planing length) approx.	kg	22000	48500 lbs
Weight per extra metre of planing length approx.	kg	2500	5500 lbs
Weight of machine with seaworthy packing (3000 mm—9'10" planing length) approx.	kg	27000	59500 lbs
Weight with seaworthy packing per extra metre of planing length, approx.	kg	2900	6400 lbs
Volume of seaworthy packing (boxes) 3000 mm—9'10" planing length approx.	cubic metres		29
Volume per extra metre of planing length	cubic feet		1024
Volume per extra metre of planing length	cubic metres		3.2
Volume per extra foot of planing length	cubic feet		35

STANDARD EQUIPMENT:

Two rail heads, one right-hand sidehead, drive by means of Ward-Leonard set consisting of main electric motor, D. C. generator direct coupled to three phase slip-ring electric motor for connection to three phase power mains, oil immersed rotor starter, controlling elements including exciter (amplidyne), protective switch, distribution box, control desk and swivelling control box, spanners and operator's instruction booklet.

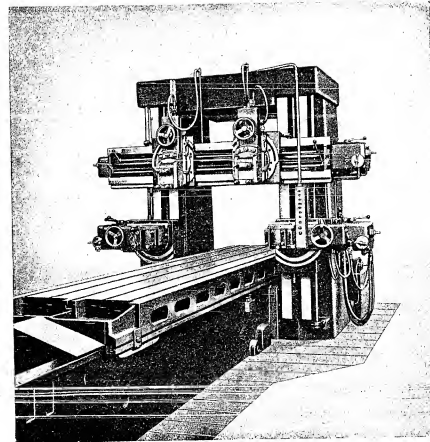
OPTIONAL EQUIPMENT:

Left-hand sidehead with automatic tool lifting device and hydraulic mechanism. Grinding attachment.

WHEN ORDERING, SPECIFY PLANING LENGTH, TABLE SPEED, AND VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

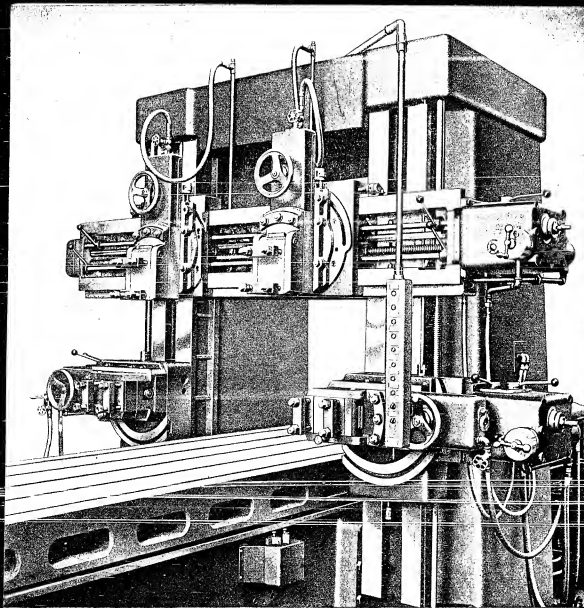
STROJEXPORT - PRAHA - CZECHOSLOVAKIA



DOUBLE HOUSING PLANING MACHINES

HD12

are High Speed, Heavy Duty machines of particularly rigid design which ensure a high grade of machined surfaces even for the heaviest operations. The precise workmanship of the machines guarantees that machined surfaces are accurately parallel and true within 0.01 mm per 1 metre of planed length. The high capacity of the machine allows cemented carbide tipped tools to be used, particularly for the machining of cast iron.



OUTSTANDING FEATURES:

1. Wide range of cutting as well as return speeds which are infinitely variable.
2. Simple and direct table drive affording high speeds and quick reversal.
3. Rapid traverse of all railheads and sideheads and of cross rail.
4. Extra low speed for special applications controlled by merely pressing a push-button.
5. Continuous checking of table speeds and load on drive.
6. Simple and quick change of feeds without interruption of work.
7. Hydraulic clamping of cross rail.
8. Hydraulic and infinitely variable feeds of railheads and sideheads.
9. Hydraulic lifting of tools on all railheads and sideheads in any position of tool head.
10. Rigidity of whole machine and high-grade workmanship permitting full utilization of cemented carbide tipped tools.
11. Arrangement of table drive with motor below floor level allowing the bed to be well stiffened with ribs and reinforced at point of table drive.
12. Pressures produced by machining absorbed by rigid gibs at tool head.
13. Special locking of railheads and sideheads and slides in any position eliminating vibrations of tool head even of highest outputs.
14. Flexible coupling between motor and bed eliminating vibrations.
15. Control of movements of all railheads and sideheads by means of a single lever. Remote control of these movements permitting operation from either end of cross rail.
16. Push-button control of machine arranged in swivelling box permitting operation from either side of machine.
17. Knife-brakes protecting table from overrunning bed.
18. Method of lubrication suitably chosen to afford uniform lubrication at all speeds.

HD12

DESCRIPTION:

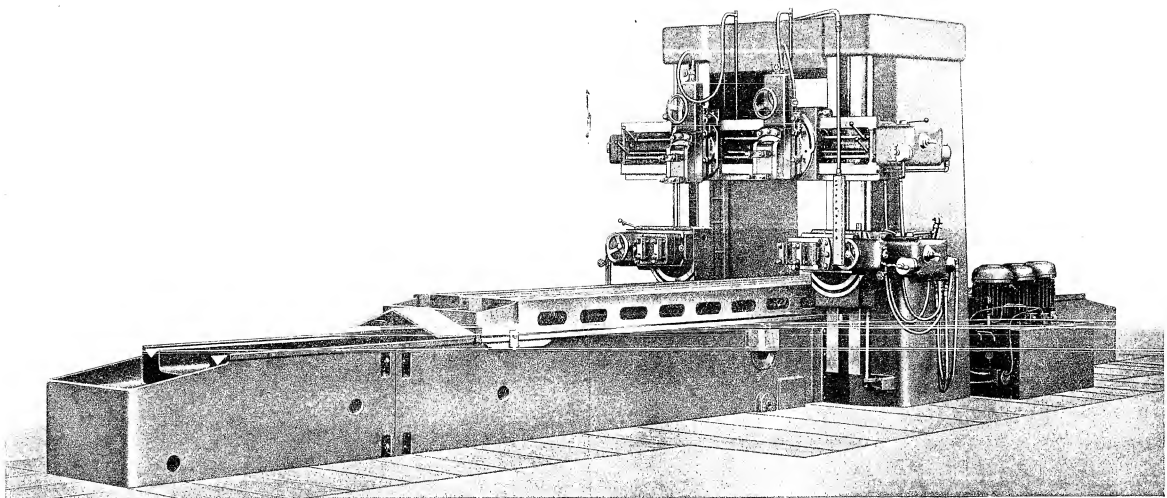
THE BED forms a strong and rigid box. Densely spaced ribs and strong walls reinforce the bed against all stresses and vibrations even at the highest cutting speeds and a full load of the bed. The central part of the bed has a higher cross section for attaching the housings which form a rigid unit with the bed. The bed rests with its entire length on the foundation. A double prismatic guideway ensures permanent accuracy in both planes even under the most difficult working conditions.

THE TABLE has a high cross section and is well reinforced with ribs both longitudinally and crosswise so that it forms a rigid unit even for the greatest planing lengths. The sliding surfaces of the table are lined with an artificial layer-forming material which protects them against seizing and reduces wear of the bed. The clamping surface of the table has a substantial allowance for wear and can be replanned repeatedly when worn. Deep T-slots and holes for stops afford universal clamping. An odd number of T-slots has been chosen for jigs and clamping fixtures. The pockets arranged at the ends of the table to stop chips from dropping on the bed can be extended and raised by means of sheet metal covers when high objects are being machined.

THE HOUSINGS are box shaped and have an almost square cross section. They are reinforced with densely spaced ribs. Joined with the bed and the upper cross member they form a strong and rigid unit resisting vibrations even at high speeds of machining.

THE FEED AND LIFTING OF TOOL HEADS are hydraulic. The movement of the distributing slide is synchronized with the movement of the table. The hydraulic fluid tank with the pumps, pump motors, distributing slides and pressure reducing valves is arranged behind the right-hand housing. The pressure of the hydraulic fluid can be adjusted by means of the pressure reducing valves which are easily accessible. The tool head pin, around which the tool head swivels for the return movement of the table, is relieved of stresses and shocks caused during operation when the tool strikes the work piece. The pin is not subject to any wear and the tool head operates with a minimum of play even when the load of the machine is at its maximum. The tool does not bounce off when it strikes the work piece. This increases the life of the cutting edge of the tool and improves the quality of the machined surface. The tool, which is subjected to shocks and considerable stresses, is clamped between grooved and hardened jaws. The automatic hydraulic tool lifter works equally efficiently in all positions of the tool head. The lifting of the tool can be stopped by pushing in a pin which locks the tool head in position. After completion of the return movement the tool head is returned to its cutting position by a spring which can also be cut out of operation by turning a knob when it is necessary to lift the tool by hand.

The tool head as well as the tool slide are locked in their positions by tapered locking gibs which draw the slide and the head into the prismatic guideways all along their surface. The tool head, which swivels 60° either way, has a dual attachment securing it to the head slide and is provided with a hand wheel for accurate setting of the tool. The hand wheel can easily be reached even in the higher positions of the head. The screw of the tool slide runs in ball bearings without any end play. It is provided with two nuts, one of which rotates and serves for eliminating backlash. The lubrication of the whole tool head is centralized so as to simplify attendance.



THE CROSS RAIL is of generous proportions, reinforced with a large number of ribs and its deep design has been chosen to resist the combined stresses produced during planing. The clamping of the cross rail is hydraulic and particularly sturdy so that the clamped cross rail forms with the housings a remarkably rigid carrier. The clamping force is easy to adjust. The cross rail is raised and lowered by means of rapid traverse. The rapid traverse motor is fitted in the top cross member. The transmission to the elevating screws is arranged by means of a worm gear rotating in anti-friction bearings in an enclosed box with an oil bath. Special safety nuts are provided securing the cross rail in case of complete wear and stripping of threads of the elevating nuts. In the case of uneven wear of the elevating screws and nuts the horizontal position of the cross rail is adjusted by means of an adjustable coupling. A limit switch prevents the rapid traverse from moving the cross rail to its extreme position where it would hit the top cross member. The rapid traverse of the cross rail is interlocked with the clamping arrangement.

THE RAIL HEADS. The controls of the feeds and rapid traverse of both rail heads are arranged at the right-hand as well as the left-hand side of the machine. Each head has its own control rod running through the entire length of the cross rail with the appropriate distribution box behind the heads.

There are sliding levers on the rod on either side of the head. All four directions of feed are controlled by means of a single lever. The distribution is arranged so that the selected direction of feed can be engaged immediately, irrespective of the momentary position of the corresponding gear. All the directions of rapid traverse are also controlled by means of this lever and the rapid traverse is engaged by means of push-buttons on the swivelling box or on the control desk. The selection of directions of feed of the two rail heads is mutually entirely independent. The accurate approach of the tool to the work piece controlled directly from the operator's position is facilitated by pawls on the heads. By means of the pawl the head can be moved horizontally as well as vertically, the appropriate direction of feed having been set beforehand by means of the control lever. The rate of power feed of the heads is infinitely variable by hand by means of a hand crank even during operation of the machine. The rate set is indicated on a dial. One of two ranges, one covering low, the other one medium and high rates, can be selected by means of a lever on the feed box. The double range affords accurate adjustment of the feed required which influences the quality of the machined surface and the accuracy of the dimensions of the machined object. The feed and rapid traverse mechanism is protected against overload by a safety clutch.

THE SIDEHEADS have independent feed and rapid traverse mechanisms. The control of the directions of feed is centralized in a single lever. The rapid traverse is engaged by means of a push-button on the swivelling box or on the control desk. The rate of feed is set independently of the rail heads.

The sideheads are balanced by counterweights, which facilitates manual as well as power operation and reduces the wear of the nut of the vertical screw to a minimum. The tool head as well as the sidehead slide are locked in their positions by means of tapered gibbs which draw the slide and the head into the prismatic guideways all along their surface. Due to this arrangement the slide as well as the head resist heavy pressures in any direction and transmit them to the housing without any play. The tool head, which swivels 60° either way, has a dual attachment securing it to the sidehead slide. The tool head runs in ball bearings and is provided with two nuts, one of which rotates and serves for eliminating end play. The tool head is provided with an automatic hydraulic tool lifter working equally efficiently in all positions of the tool head. It is returned to its cutting position by a spring. The tool lifter can be out of operation for internal planing. The tool head pin, around which the tool head swivels for the return movement of the table, is relieved of stresses and shocks caused during operation when the tool moves into the cut and is therefore not subject to wear. Due to this arrangement, accuracy is maintained even under the heaviest loads of the head. The tool does not bounce off when it strikes the workpiece which increases the life of the cutting edge of the tool and improves the quality of the machined surface. The tool is clamped between grooved and hardened jaws.

THE TABLE DRIVE. The table is driven by an electric motor fed from a Ward-Leonard set and arranged below floor level. It is coupled to the driving pinion in the bed by means of a flexible coupling by which silent operation is achieved. The pinion as well as the other gears run in anti-friction bearings. Particular care has been devoted to the design of the bearings of the gear engaging with the rack of the table. They are adjustable taper roller bearings. The arrangement of the driving motor below floor level enables the size of the gearing to be selected to ensure a long life and low stresses.

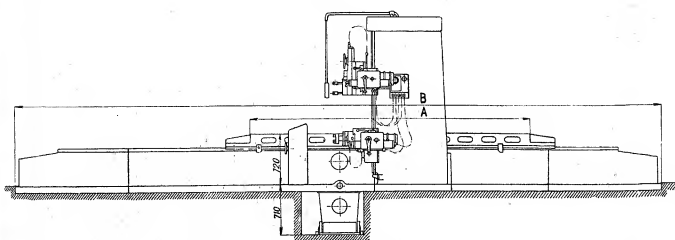
The main driving gear is in the centre of the bed and power is transmitted to it by a double helical

gear. Thrusts are mutually balanced. Silent operation is guaranteed by careful machining and by a large number of teeth of the pinions. The drive is short and direct which reduces rotating masses to a minimum. This in turn reduces the current surges produced when the table is reversed. The motor has its own cooling system which draws air from the space inside the bed to which chips and other impurities have no access. The gears and anti-friction bearings are lubricated by means of an oil spray from an independent oil pump.

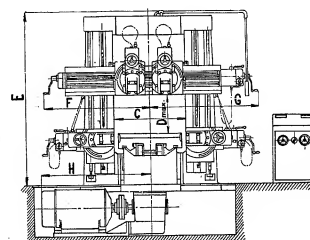
THE WARD-LEONARD SET. The wide range of speeds enables cemented carbide tipped tools to be taken advantage of, particularly for the machining of cast iron. The control of the movement of the table is centralized on the swivelling box and on the control desk. The swivelling box enables the machine to be operated from either operator's post. The cutting as well as return speed is infinitely variable by means of push-buttons from the control desk even during operation. A tachometer indicates the momentary speed of the table. The load produced by the cut being taken can also be continuously followed on the load indicator. Apart from the push-buttons for the cutting and return movements of the table and for stopping the table, the swivelling box and control desk also contain a push-button for low speed (about 3 metres or 10 feet per minute). This speed is used for observation of the machined surface and for indication.

THE LUBRICATION OF THE TABLE is arranged by means of an independent oil pump which ensures a uniform film of oil between the guiding surfaces and, as a result, a high degree of accuracy of the machined surface. The wipers at either end prevent impurities from penetrating between the sliding surfaces, which therefore keep their accuracy for a long time. Oil is supplied by an oil pump through an oil filter. Its quantity and pressure can be adjusted as required.

SAFEGUARDS OF THE TABLE. In view of its high speeds, the table is provided with a knife brake to prevent it from overrunning the bed in case the rack should get out of mesh with the main gear. Adjustable knives are fitted at either end of the bed and a ruler fitted to the table runs over these knives. The rulers are exchangeable. This brake is very efficient, yet it acts smoothly without harmful shocks.



A	B	C	D	E	F	G	H
3000—12000	8220—26220	1250	1250	2750	1580	1680	1560



SPECIFICATION

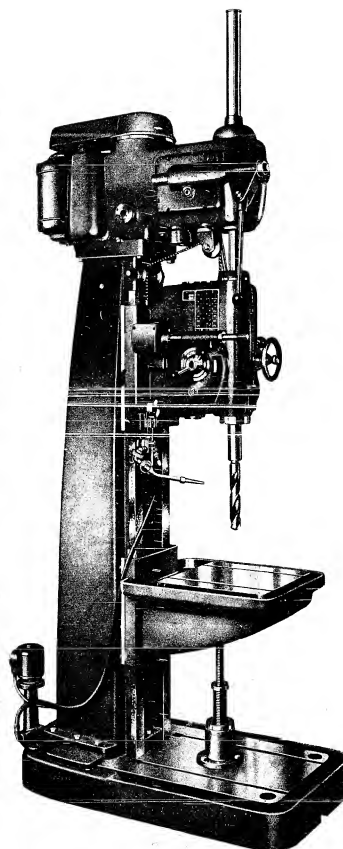
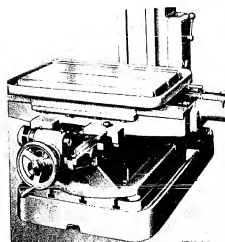
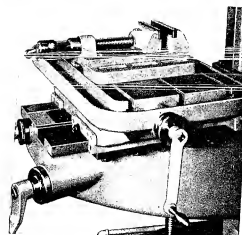
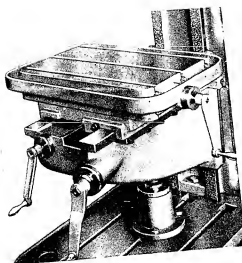
	V-40	Metric	V-50
Drilling diameter in steel/in cast iron	mm	40/50	50/60
Drilling depth	mm	240	265
Diameter of spindle	mm	36/42	46/53
Taper in spindle	Morse	4	5
Working surface of table	mm	450×450	500×500
Working surface of base plate	mm	540×660	560×740
Max./min. distance, nose of spindle to working surface of table	mm	650/150	700/235
Max. distance, spindle to base plate	mm	1120	1160
Distance, centre line of spindle to table guideways	mm	375	420
Vertical travel of headstock	mm	300	350
Number of spindle speeds		12	12
Range of spindle speeds	r. p. m.	48 to 950	37 to 760
Number of feeds		4	6
Range of feed per rev.	mm	0.12 to 0.80	0.12 to 1.25
Speed of motor	r. p. m.	1400/2800	1400/2800
Output of motor	HP	3/4	4/5.5
Floor space required	mm	690×1260	720×1380
Weight of machine:			
with standard equipment	kg	1400	1850
shipping, ordinary packing	kg	1900	1970
shipping, seaworthy packing	kg	1740	2270
Volume of crate cu. metres		3.4	4.4

Compound table			
Working surface of table	mm	350×600	400×700
Max. distance, spindle to working surface of compound table fitted to base plate	mm	680	610
Longitudinal travel of table	mm	400	400
Cross travel of table	mm	300	300

	V-40	English	V-50
Drilling diameter in steel/in cast iron		1 5/8"/2"	2 1/2"/1 1/4"
Drilling depth		9 1/2"	10 3/8"
Diameter of spindle		1 3/8"/1 5/8"	1 3/4"/2 1/4"
Taper in spindle		4	5
Working surface of table		17 3/4"×17 3/4"	19 3/4"×19 3/4"
Working surface of base plate		21 1/4"×26"	22"×29 1/4"
Max./min. distance, nose of spindle to working surface of table		25 5/8"/5 7/8"	27 1/2"/19 1/4"
Max. distance, spindle to base plate		44"	45 3/4"
Distance, centre line of spindle to table guideways		14 3/4"	16 1/2"
Vertical travel of headstock		11 3/4"	13 3/4"
Number of spindle speeds		12	12
Range of spindle speeds		48 to 950	37 to 760
Number of feeds		4	6
Range of feed per rev.		.0047" to .031"	.0047" to .049"
Speed of motor		1400/2800	1400/2800
Output of motor		3/4	4/5.5
Floor space required		27"×50"	28"×54"
Weight of machine:			
with standard equipment		3100 lbs	4100 lbs
shipping, ordinary packing		3300 lbs	4350 lbs
shipping, seaworthy packing		2840 lbs	5000 lbs
Volume of crate		120 cu. ft.	155 cu. ft.

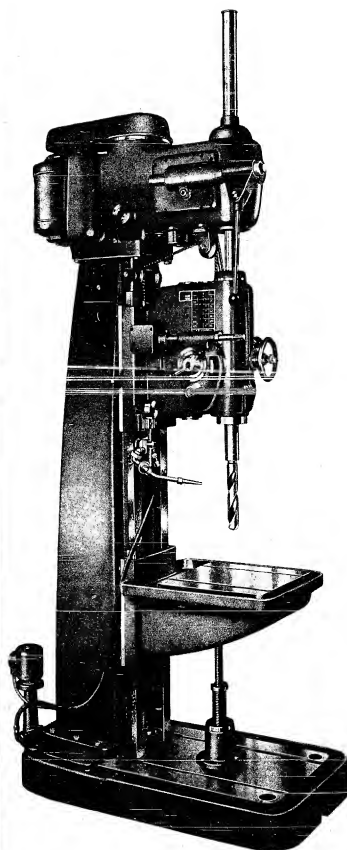
Compound table		
Working surface of table	13 3/4"×23 5/8"	15 3/4"×27 1/2"
Max. distance, spindle to working surface of compound table fitted to base plate	26 3/4"	34"
Longitudinal travel of table	15 3/4"	15 3/4"
Cross travel of table	11 3/4"	11 3/4"

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UPRIGHT DRILLS





V50

UPRIGHT DRILLS

of this type have the following outstanding features:

- Wide range of spindle speeds.
- Automatic power feed release in either direction of rotation of spindle at pre-set drilling depth.
- Adjustable drilling depth.
- Multi-plate clutch for forward and reverse rotation of spindle.

The Headstock is driven by an electric motor by means of V-belts. Its housing is totally enclosed and contains the gears and the multi-plate clutch for the change of the direction of rotation of the spindle. The spindle speeds are changed by means of a lever on the gear box and by changing over the two-speed electric motor. Another lever controls the multi-plate clutch.

The Headstock Spindle is driven by the splined headstock spindle sleeve. It is mounted in the raising block which travels along the guideways of the column and is balanced by a counterweight. The bore of the spindle nose is provided with a Morse taper.

The Feed Mechanism is housed in the raising block of the spindle. The feed is hand operated or power operated with an automatic release at a pre-set drilling depth. The exact drilling depth is set on a scale. The feeds are changed by two hand levers. The raising block is moved up and down by a hand crank, on the type V 50 also by power.

PLEASE SPECIFY THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS IN YOUR ORDERS FOR MACHINES

DIMENSION DRAWING:

Millimetres:

	a	b	c
V-40	1260	690	2800
V-50	1380	720	3020

Inches:

	a	b	c
V-40	50	27	110
V-50	55	29	119

The Table is square. It is provided with T-slots and with a draining groove for the coolant. The table is moved up and down by a hand crank.

The Column is box shaped and its base plate is provided with T-slots for clamping the work.

The Cooling Equipment: Coolant is supplied by an electrically driven pump from a tank formed in the base plate of the machine. Standard Equipment: Electric motor 220/380 Volts, 50 cycles, with pole-changing switch, V-belts, belt guards, electric motor driven pump, crank for raising table and feed box, set of spanners.

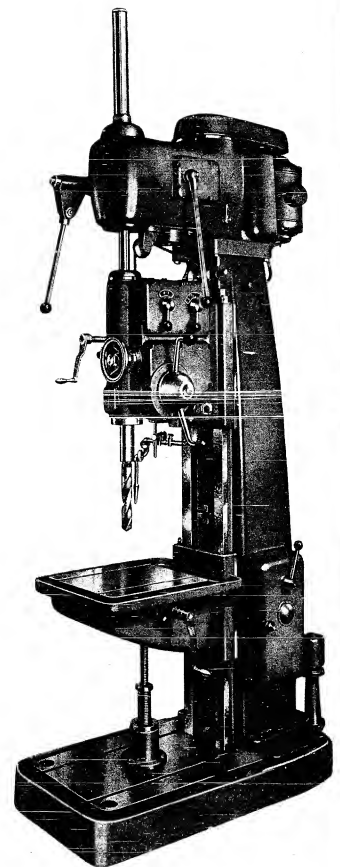
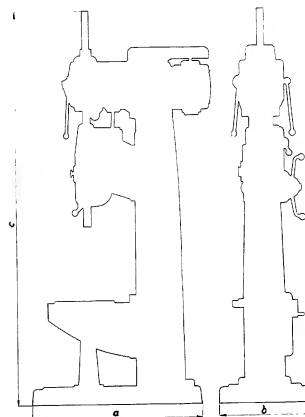
Optional Equipment: Machine vice, 3-jaw chucks with stem, reducing sleeves.

COMPOUND TABLES

SPECIAL DESIGN:

The machine can be supplied, to special order, with a compound table mounted either on the knee or on the base.

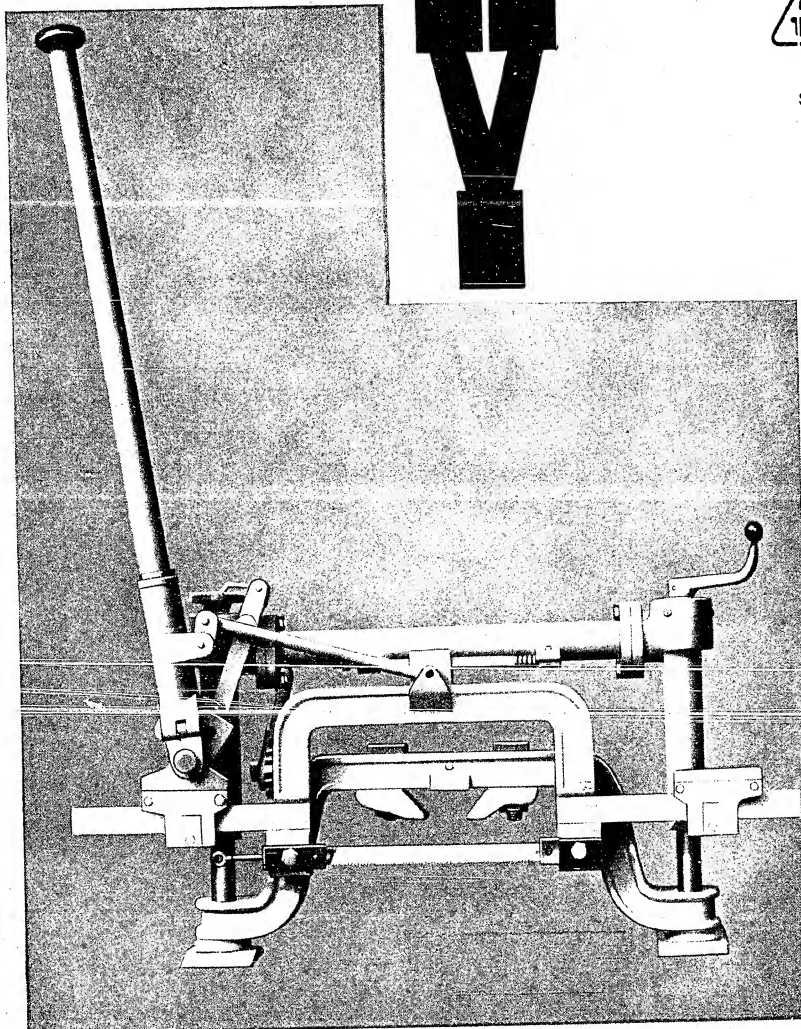
The drawings are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.



HACKSAW MACHINE FOR RAILS Model



STAT



A portable, hand-operated machine for cutting rails at the working place

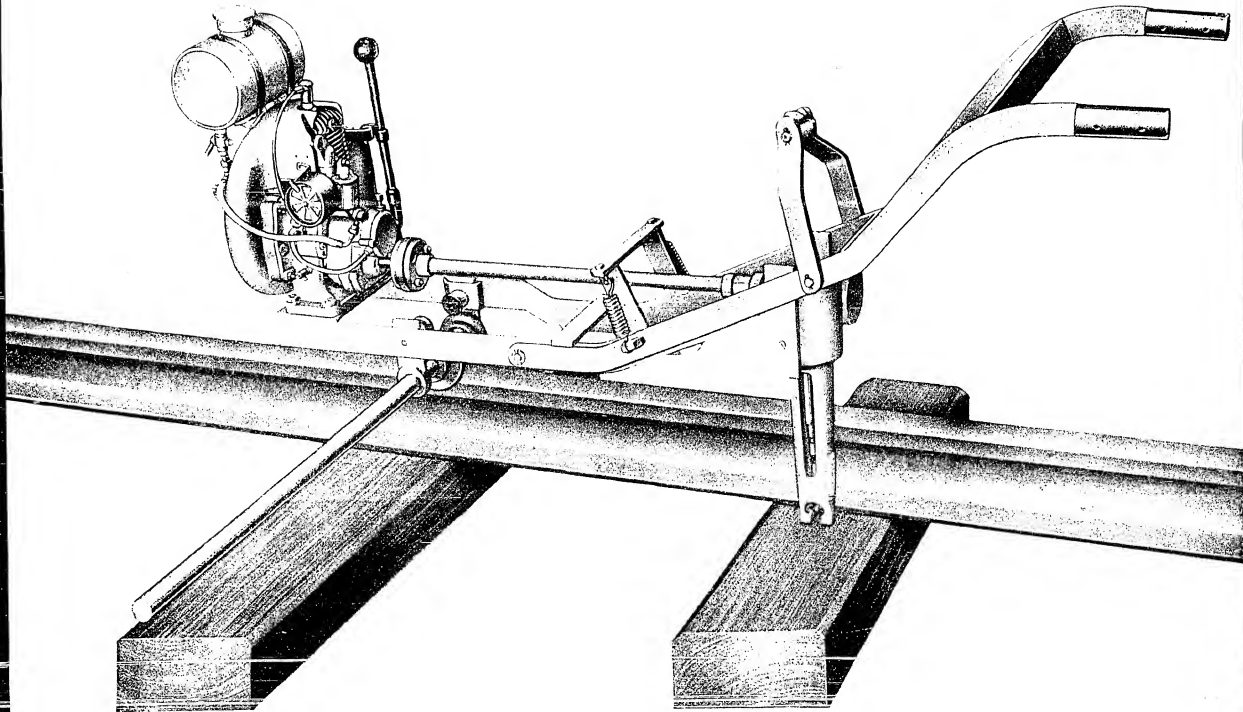
The saw frame is moved by the reciprocating motion of a hand lever and automatically fed into the cut. The feed rate can be easily changed by tightening or loosening a knob on the hand lever. The clamping of the machine is easy, quick and reliable. The saw is set into the cut by means of a hand crank.

Specifications:

Length of saw blade	mm	350
Time required for cutting a standard rail	about minutes	25
Overall dimensions: Height	mm	1400
Width	mm	350
Length	mm	1100
Weight of machine	about kg	77

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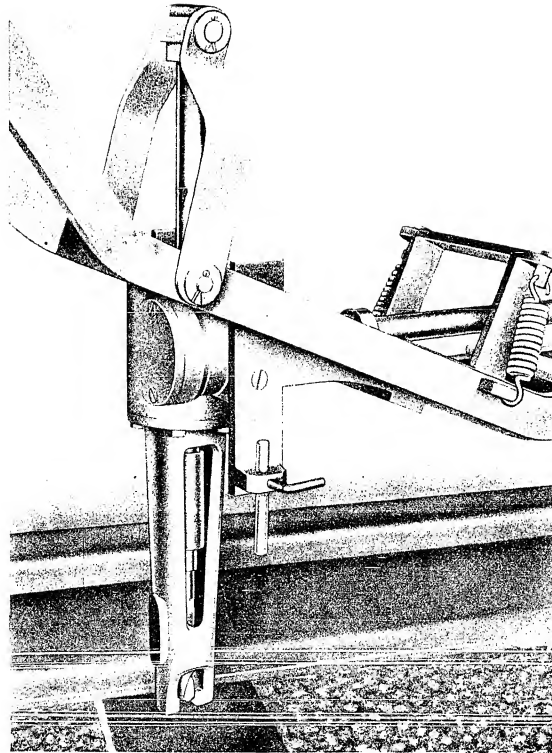
POWER-OPERATED SLEEPER DRILL Model MPV

This machine eliminates the tiresome operation of drilling holes in sleepers by means of a hand drill or a portable electric drill. The machine is adapted for drilling direct on the open line.

A standard twist drill is used for the operation whereby drilling with templates is made possible. The ingeniously arranged feeding of the drill into the cut makes the operation very easy so that the worker can pay all his attention to the adjustment of the twist drill. Thus the operation is speeded up and a high output is obtained. The drilling depth is readily adjusted by an adjustable stop.

SPECIFICATIONS:

Maximum diameter drilled	mm	20
Maximum drilling depth	mm	140
Taper in spindle	Morse	No. 2
Over-all dimensions of machine: Length	mm	1700
Width	mm	550
Height	mm	850
Weight of machine	kg	70
Dimensions of box	mm	2000×700×900



Driving motor: A gasoline motor of the vertical type, air-cooled, two-stroke, one-cylinder, cylinder capacity 150 ccm, with starting belt. Output 2 HP, speed 3000 r. p. m., with reduction of 1 : 2 to 1500 r. p. m.

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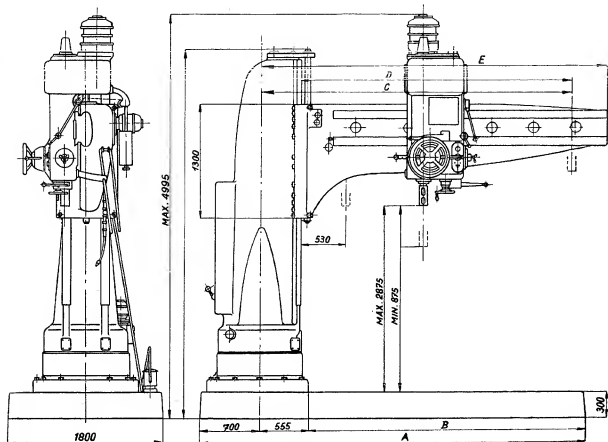
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SPECIFICATION:

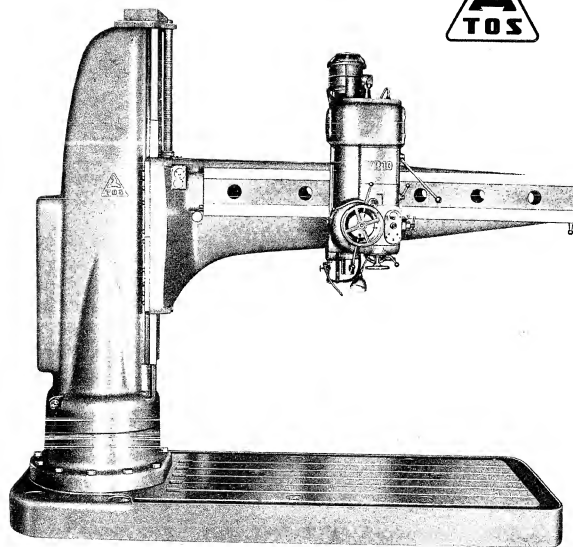
Type	VR 103	VR 104
Maximum distance, guideway prism to extreme position of spindle	3150 10'4"	4000 13'1"
Maximum distance, guideway prism to spindle	3120 10'1"	4470 14'6"
Maximum radius in extreme position of spindle	2500 8'3"	3120 10'1"
Maximum and minimum distance, spindle nose to working surface of base	1475 4'8"	1475 4'8"
Vertical movement of arm	2120 6'9"	3470 11'3"
Turret of spindle head on arm	4700 15'0"	5550 18'0"
Swing of arm on column	140° 4'31"	175° 5'31"
Dimensions of base	3250 10'6"	4000 13'1"
Working surface of base	10'5" x 10'0"	13'1" x 10'0"
Height of base	500 1'6"	550 1'8"
Number, width and pitch of holes of base	8/110 3/8"	8/110 3/8"
Diameter of spindle and spindle nose	8/110 3/8"	8/110 3/8"
Taper in spindle	No. 6 Morse	No. 6 Morse
Lock of spindle	475 1'5"	475 1'5"
Number of spindle speeds	12	12
Speed ranges standard	11.2 to 500 — 22.5 to 1000	11.2 to 500 — 22.5 to 1000
Higher	10 to 210 — 31.5 to 1400	10 to 210 — 31.5 to 1400
Number of spindle feeds	10	10
Range of feeds	0.05 to 7.54 0.0025" to 0.141" per rev.	0.05 to 7.54 0.0025" to 0.141" per rev.
Maximum diameter of drilling in steel with tensile strength of 60 kg per square mm	100 4"	100 4"
Maximum diameter of drilling in steel with tensile strength of 22 kg per square mm	125 5"	125 5"
Maximum size of thread cut in steel with tensile strength of 60 kg per square mm	M 100/M 120 4" 7/8"	M 100/M 120 4" 7/8"
Maximum diameter of boring in steel with tensile strength of 60 kg per square mm	150 6"	150 6"
Drilling motor 1150/210 r. p. m.	1.5	1.5
Drilling motor 1150 r. p. m.	1.1	1.1
Chucking motor 100 r. p. m.	0.215	0.215
Constant pressure motor 2000 r. p. m.	1.1	1.1
Overall dimensions of machine	4700/1000/3000 15'7" x 31'1" x 10'0"	5550/1000/3000 18'3" x 31'1" x 10'0"
Weight of machine	10000 30000 lbs	12000 33000 lbs

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR ELECTRIC MOTORS.

The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.



STROJEXPORT PRAHA-CZECHOSLOVAKIA



RADIAL DRILLING MACHINES

TYPE

These machines are intended for the drilling and boring of holes and cutting of threads in big and complicated machinery parts. There are many uses for them in individual manufacture as well as in quantity production.

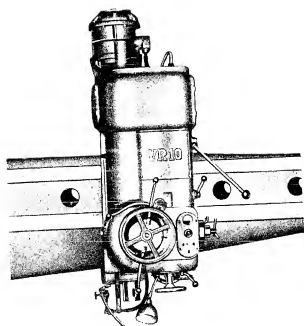
The new design of these machines constitutes an improvement in that the rigidity of the main structural parts has been increased and, as a result, the general precision of the machines improved. The new design consists in the arm being carried on the sleeve on wide prismatic guide-ways. The advantages achieved thereby are a lasting increased accuracy and easy movement.

The machines are built in the following two models:

Model VR 103 with a radius of 3150 mm (10'4") and

Model VR 104 with a radius of 4000 mm (13'1").





OUTSTANDING FEATURES:

- High capacity and sustained high accuracy.
- Wide range of spindle speeds arranged in 12 steps of standard range with possibility of changing over to higher range.
- Wide range of power feeds.
- Mechanical elevation of arm.
- Automatic disengagement of power feed when required depth of drilling is reached.
- Handy and concentrated arrangement of controls on spindle head which substantially reduces setting-up times.
- Easy cleaning, lubrication and maintenance of all parts of machine.

COOLING. The machine is equipped with a cooling system with an independent centrifugal pump which supplies coolant from a tank formed in the rear part of the base through a pipe line to the tool.

LUBRICATION. All moving parts of the spindle head are lubricated automatically by a stream of oil supplied by an oil pump in the spindle head from a tank arranged in the lower part of the spindle head to the multi-plate clutch shaft from which it is thrown over the clutch plates to the gears. The guide-ways of the arm on the column and the elevating screw are lubricated by a three piston hand pump provided with a device controlling the quantity of oil supplied to the various points.

STANDARD EQUIPMENT. Electrical equipment including electric motors, cooling equipment, 2 hooks for lifting the spindle head including bolts and nuts, T-bolts, 1 hooks for lifting the base, set of Morse taper sleeves sizes 6/5, 5/4, 5/3 and 4/3, set of taper removing wedges, set of spanners, oil can, T-slot cleaner, 2 screw drivers, instruction book.

SPECIAL EQUIPMENT. 2 change gears for higher range of spindle speeds, i. e. 16 to 1100 r.p.m., style Vr 10, box type table style VR 103, universal table style VR 101, vice style Vd 1.

DESCRIPTION:

THE SPINDLE HEAD. The spindle head forms a totally enclosed box. It is easy to move along the arm by means of a hand wheel and can be locked in any required position by means of a lever arranged at the right hand side of the spindle head.

The gear box of the spindle head has 12 speeds arranged in geometrical progression with a coefficient of 1.41.

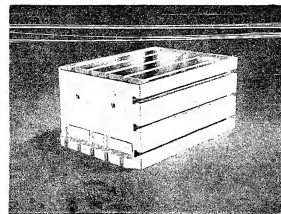
Gears for a higher speed range are supplied for the machine to special order. Their exchange is easy to make when the top cover of the spindle head is removed. The gear box is driven by a flange mounted motor controlled by a cross type switch. The machines are equipped with partial pre-selection.

THE SPINDLE. The spindle runs in precision anti-friction bearings. The weight of the spindle is balanced by a counterweight. The feed box forms an independent unit and is arranged at the right hand side of the central part of the spindle head.

The spindle has a hand feed and a power feed. There are two kinds of hand feed: coarse, by means of hand levers in the power feed head and fine by means of a hand wheel on the lower part of the spindle head.

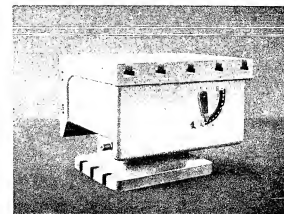
The safety clutch of the feed allows only the maximum permissible power to be transmitted and thus protects the machine from damage. The clutch is controlled by a lever arranged above the depth scale. This same lever also serves for disengaging the power feed when working to a fixed stop. The required depth of drilling is set on a circular scale with a vernier. This arrangement permits the depth of drilling to be set with an accuracy of 0.05 mm (0.002").

STRUCTURAL PARTS OF MACHINE. The arm is marked by its outstanding rigidity. The wide guide-ways of the spindle head are accurately ground. The sleeve is suspended on the column by means of a sturdy tapered roller bearing. It is guided at the bottom by several radial ball bearings running in hardened bushes on adjustable eccentric pins. This arrangement results in a lasting high accuracy and easy movement. The sleeve is locked on the column by means of a separate motor fitted at the bottom of the sleeve and controlled by a push button on the switch panel of the spindle head. The base is provided with T-slots for the clamping of work pieces.



BOX TYPE DRILLING TABLE STYLE VR 103:

Top working surface	mm	1010×755
	inches	40"×30"
Number, width and pitch of T-slots	mm	5×28×160
	inches	5×1 1/16"×6 3/16"
Side working surface	mm	1010×500
	inches	40"×20"
Number, width and pitch of T-slots	mm	3×28×160
	inches	3×1 1/16"×6 3/16"
Dimensions of base	mm	1060×750
	inches	42"×30"
Number, width and pitch of T-slots	mm	5×30×125
	inches	5×1 1/16"×5"
Overall dimensions of table	mm	1060×755×500
	inches	42"×30"×20"
Weight of table	kg	410
	lbs	905



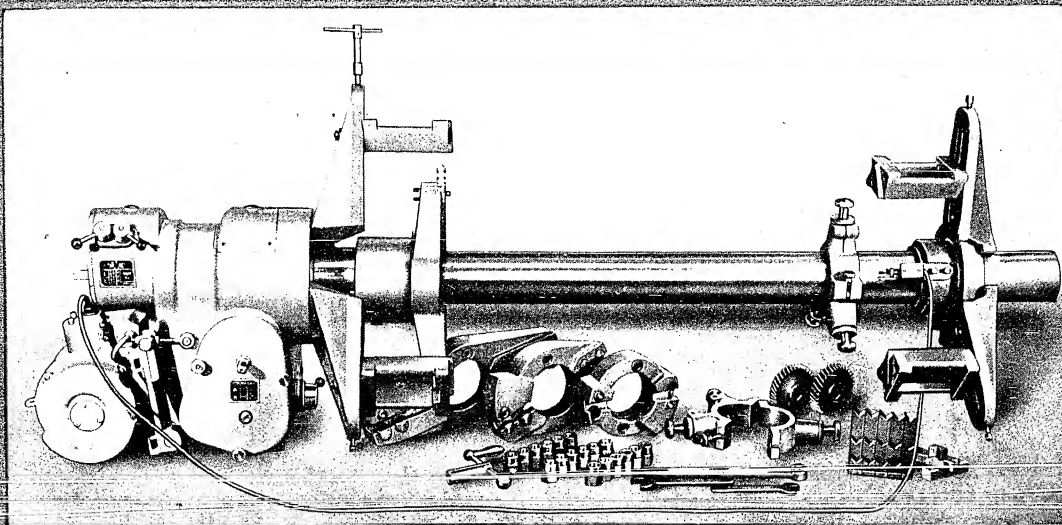
UNIVERSAL DRILLING TABLE STYLE VR 104:

Top working surface	mm	750×600
	inches	30"×24"
Number, width and pitch of T-slots	mm	5×28×160
	inches	5×1 1/16"×6 3/16"
Side working surface	mm	750×410
	inches	30"×16"
Number, width and pitch of T-slots	mm	2×28×160
	inches	2×1 1/16"×6 3/16"
Dimensions of base	mm	560×460
	inches	22"×18"
Number, width and pitch of T-slots	mm	3×30×125
	inches	3×1 1/16"×5"
Overall dimensions of table	mm	890×620×550
	inches	35"×24 1/2"×22"
Range of tilting	degrees	0-90
Weight of table	kg	420
	lbs	925

STAT

**Transportable Boring Machine
Model TOS VS 3 for Boring Steam Slide Valve
Chests of Locomotive Cylinders**

VS3



This machine is designed for the economical reboring of locomotive slide valve chest. The operation can be performed directly on the locomotive without dismantling the cylinder. The machine is built for a high capacity boring and with the fact in mind that hard alloy tools will be used within its lifetime.

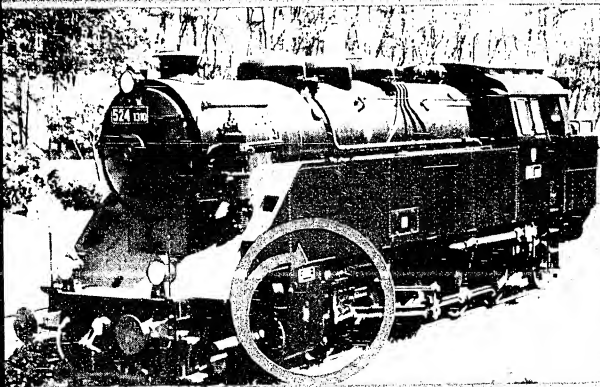
GENERAL DESCRIPTION:

The machine is fastened on both sides by clamping arms and interpieces to the bolts holding the covers of the slide valve chest. The clamping arms are guided both on the box of the machine and on the end bearing in circular guideways and can be adjusted to any number of bolts of the slide valve chest. The interpieces enable an easy access to the boring head to allow micrometric adjustment of the tools. The boring spindle carries the tool head to which the tools are clamped. The tool heads are interchangeable to suit the boring diameter.

The spindle speeds are changed by a handlever on the three-speed gear box. Six different spindle speeds within the range of 16—87 r. p. m. can be obtained by using a pair of change gears.

The spindle is driven by V-belts from the electric motor through the gear-box and worm gears. The tool is fed into the cut by a screw mounted in the boring spindle. It is driven from a differential four-speed gear-box. The feed rate is adjusted by two handlevers. After disengaging the gears in the feed box the tool head can also be moved by a hand crank. For the power coarse adjustment the rapid traverse is employed.

The machine is equipped with two two-part centering stars the micrometrically adjustable bolts of which are pre-set to suit the cylinder diameter. The stars enable a quick adjustment of the boring spindle accurately into the centre of the spindle cylinder. After the spindle has been centred the stars can easily be removed.



The machine is also provided with a limit switch which automatically cuts out the motor after the operation has been finished.

When using two tools clamped diametrically in the head the machine works with exceptional accuracy and a superfinished surface is obtained. The machine is supplied with the following standard equipment: Complete electrical equipment comprising one 1400 r. p. m. electric motor, 2 push buttons, 1 switch, 1 contactor, 1 limit switch and cable with 1 two-pole socket and 2 two-pole plugs.

In addition, each machine is equipped with the following accessories:

6 arms with clamping bolts
2 centering stars
3 tool heads
1 end bearing with switch and cable
6 interpieces
6 interchangeable centering bushes
18 arm inserts
2 M 12 bolts
1 socket wrench 14 mm
1 socket wrench 10 mm
1 socket wrench 41 mm
6 nuts 7/8"
1 crank
1 pattern tool
6 interchangeable centering screws
4 gears for spindle speed change
1 wrench
1 operator's instruction booklet

SPECIFICATIONS:

	Metric:	English:
Diameter of spindle	mm 90	3.54"
Min. diameter bored	mm 160	6.3"
Max. diameter bored	mm 400	15.7"
Max. length of locomotive cylinder	mm 1300	51"
Spindle speeds	r. p. m. 16, 22, 31, 44, 62, 87	16 22, 31, 44, 62, 87
Feeds	mm/rev 0.05, 0.3, 1, 16	1.6" 25.4" 8.5" 51"
Motor: Speed	r. p. m. 1400	1400
Output	kW 2.2	2.2
Dimensions of machine: Length	mm 2800	110"
Width	mm 600	23.6"
Height	mm 650	25.5"
Weight of machine: with accessories	kg 800	1770 lbs
with packing	kg 980	2160 lbs
with seaworthy packing	kg 990	2180 lbs
Contents boxed	m ³ 1.89	67 cu. ft.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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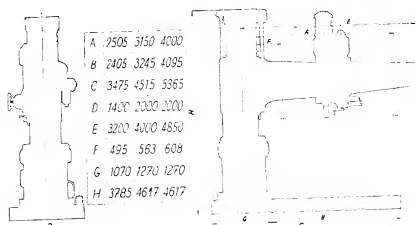
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SPECIFICATION

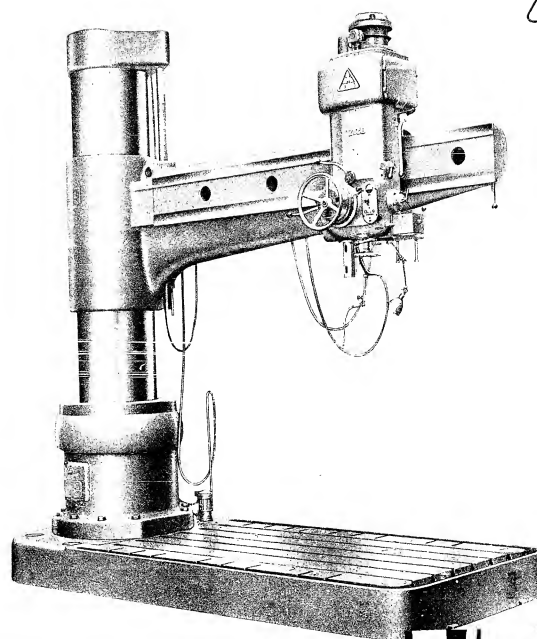
Model	VR 8	VR 83	VR 84
Maximum distance, guideway prior to extreme position of spindle	2305 98"	3130 124"	4000 157"
Minimum distance, sleeve to spindle	495 19.5"	585 23"	620 24.4"
Maximum radius in extreme position of spindle	2785 110"	3509 137.5"	4350 171"
Maximum and minimum distance, spindle head to working surface of table	2125/625 83.5"/24.4"	2847/952 112"/37.7"	
Vertical movement of table	1050 41.3"	1445 56.7"	
Travel of spindle head on arm	2010 79"	2387 102"	3392 133"
Swing of arm on column	360° 26"	360° 700	360° 27.5"
Diameter of sleeve	550 21.7"	4515/3000 178"/78.5"	5345/2000 211"/78.5"
Dimensions of base	136x455" 3400x1180	178x478.5" 3230x1970	211x478.5" 4600x1970
Working surface of base	94"x42"	127"x75"	161"x77"
Number, width and distance between T-slots of base	4x30-250 4x118"x8.8"	6x25x250 350	6x108"x9.8"
Height of base	260 10.4"	55 102 2.16 4"	350 13.7"
Diameter of spindle and spindle head		No. 6 Morse 450 17.7"	
Taper in spindle		12/4"	
Stroke of spindle		11.2 to 500	
Number of spindle speeds		22.5 to 1000	
Speed range		16 to 710	
standard		31.5 to 1400	
higher		10	
higher			
Number of spindle feeds		0.004 to 0.0001 mm/min	
Range of spindle feeds	0.035 to 2.2	0.004 to 0.0001 mm/min	
Drilling capacity in C 40 steel	dia 80 3.14" dia	dia 110 4.3" dia	
Drilling capacity in cast iron with tensile strength of 40 kg per square mm	dia 110 4.3" dia	dia 110 4.3" dia	
Thread cutting capacity in steel/cast iron	M 75/M 100 3" dia	dia 300 12" dia	
Boring capacity in steel	dia 300 12" dia	dia 300 12" dia	
Drilling motor, 1400/2820 r.p.m.	3	6	8.5
Elevating motor, 1430 r.p.m.	0.34	1.1	1.1
Arm and column clamping motor, 1400 r.p.m.		0.125	
Coilant pump motor, 2800 r.p.m.	9800 21600 lbs	18000 39700 lbs	22000 48500 lbs
Weight of machine, approx.	3800x1400x1190	5010x2000x5020	5850x2000x5020
Overall dimensions of machine	149" x 155" x 165"	197" x 78" x 204"	238" x 78" x 204"

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR ELECTRIC MOTORS
The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.



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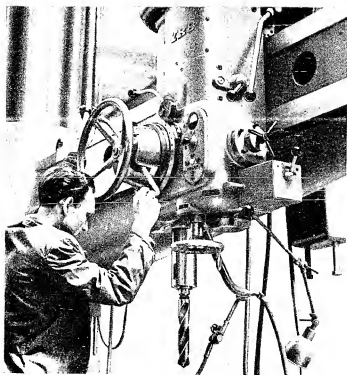
TYPE VR 8 RADIAL DRILLING MACHINES

Are intended for the drilling and boring of holes and cutting of threads in big and complicated machinery parts. There are many uses for them in individual manufacture as well as in quantity production. Due to the short times required for the setting-up of the machine they surpass, in many respects, horizontal boring machines if used with suitable jigs.

The machines are manufactured in three designs:

- Model VR 8 with useful length of arm 2500 mm (100 inches)
- Model VR 83 with useful length of arm 3150 mm (124 inches)
- Model VR 84 with useful length of arm 4000 mm (157 inches)

VR 8



OUTSTANDING FEATURES:

- 1. High capacity and sustained high accuracy.
- 2. Wide range of spindle speeds arranged in 12 steps of standard range with possibility of changing over to higher range.
- 3. Wide range of power feeds.
- 4. Three different methods of spindle feed: coarse hand feed, fine hand feed and power feed.
- 5. Mechanical elevation of arm.
- 6. Reliable clamping of arm on column by means of securing nut.
- 7. Automatic disengagement of power feed when required depth of drilling is reached.
- 8. Handy and centralised arrangement of controls on spindle head.

DESCRIPTION

THE SPINDLE HEAD

The spindle head forms a totally enclosed box. It is easy to move along the arm by means of a hand wheel and can be locked in any required position by means of a lever arranged at the right hand side of the spindle head. It is driven off the spindle. The spindle head has 12 speeds arranged in geometrical progression with a coefficient of 1.41. Gears for a higher speed range are supplied for the machine to special order. Their exchange is easy to make when the top cover of the spindle head is removed. The gear box is driven by a flange mounted motor controlled by a cross type switch. The machines are equipped with partial pre-selection.

THE SPINDLE

The spindle runs in precision anti-friction bearings. The weight of the spindle is balanced by a counterweight. The feed box forms an independent unit and is arranged at the right hand side of the central part of the spindle head. It is driven off the spindle. The spindle has a hand feed and a power feed. There are two kinds of hand feed: coarse, by means of hand levers in the power feed box and fine by means of a hand wheel on the lower part of the spindle head. The safety clutch of the feed allows only the maximum permissible power to be transmitted and thus protects the machine from damage. The clutch is controlled by a lever arranged above the depth scale. This same lever also serves for disengaging the power feed when working to a fixed stop. The required depth of drilling is set on a circular scale with a vernier. This arrangement permits the depth of drilling to be set with an accuracy of 0.05 mm (0.002").

STRUCTURAL PARTS OF MACHINE

The arm is marked by its outstanding rigidity. The wide guideways of the spindle head are accurately ground. The arm is easy to rotate by means of a handle fitted to its end. The sleeve is suspended on the column by means of a sturdy taper roller bearing. It is guided at the bottom by several radial ball bearings running in hardened bushes on adjustable eccentric pins. This arrangement results in a lasting high accuracy and easy movement. The sleeve is locked on the column by means of a separate motor fitted at the head of the column and controlled by

a push button on the switch panel of the spindle head. The column is of generous dimensions and suitably reinforced with cross ribs. It guarantees a high degree of rigidity in all working positions of the arm and spindle head. The mechanism for raising and lowering the arm and spindle head is driven by a separate electric motor fitted on the rear of the arm. The power is transmitted by a worm and worm gear. The extreme positions of the arm on the column are secured by stops which automatically stop the elevating motor. The machines are provided with a securing nut which secures the arm on the column in case the thread of the elevating nut should wear out after a very long period of operation. The arm is clamped to the column by means of an electric motor controlled by a push button on the switch panel of the spindle head.

COOLING

The machine is equipped with a cooling system with an independent centrifugal pump which supplies coolant from a tank formed in the rear part of the base through a pipe line to the tool.

LUBRICATION

All moving parts of the spindle head are lubricated automatically by a stream of oil supplied by an oil pump in the spindle head from a tank arranged in the lower part of the spindle head to the multi-plate clutch shaft from which it is thrown over the clutch plates to the gears.

STANDARD EQUIPMENT

Electrical equipment including electric motors, cooling equipment, 2 hooks for lifting the spindle head including bolts and nuts, T-blocks and plugs, set of Morse taper sleeves sizes $\frac{1}{2}$, $\frac{3}{4}$, $1\frac{1}{2}$, 2 , and $2\frac{1}{2}$, set of taper removing wedges, set of spanners, oil can, T-slot cleaner, 2 screw drivers, instruction book.

SPECIAL EQUIPMENT

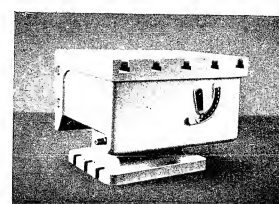
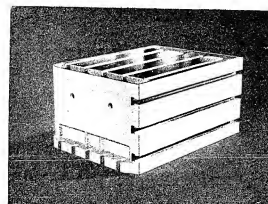
2 change gears for higher rate of spindle speeds i. e. 16 to 1400 r. p. m., style Ve 8, box type table style Vb 8, universal table style Vc 8, vice style Vd 4.

BOX TYPE DRILLING TABLE STYLE Vb 8:

Top working surface	mm 1010 x 755
Number, width and distance of T-slots	inches 40 x 30
Side working surface	mm 5 x 28 x 160
Number, width and distance of T-slots	inches 5 x 1 1/2 x 6 3/16
Dimensions of base	mm 1010 x 500
Number, width and distance of T-slots	inches 40 x 20
Dimensions of base	mm 3 x 28 x 160
Number, width and distance of T-slots in base	inches 3 x 1 1/2 x 6 3/16
Overall dimensions of table	mm 1060 x 550
Weight of table	inches 42 x 30
	mm 5 x 30 x 125
	inches 5 x 1 1/2 x 5
	mm 1060 x 755 x 500
	inches 42 x 30 x 20
	kg 450
	lbs 995

UNIVERSAL DRILLING TABLE STYLE Vb 3:

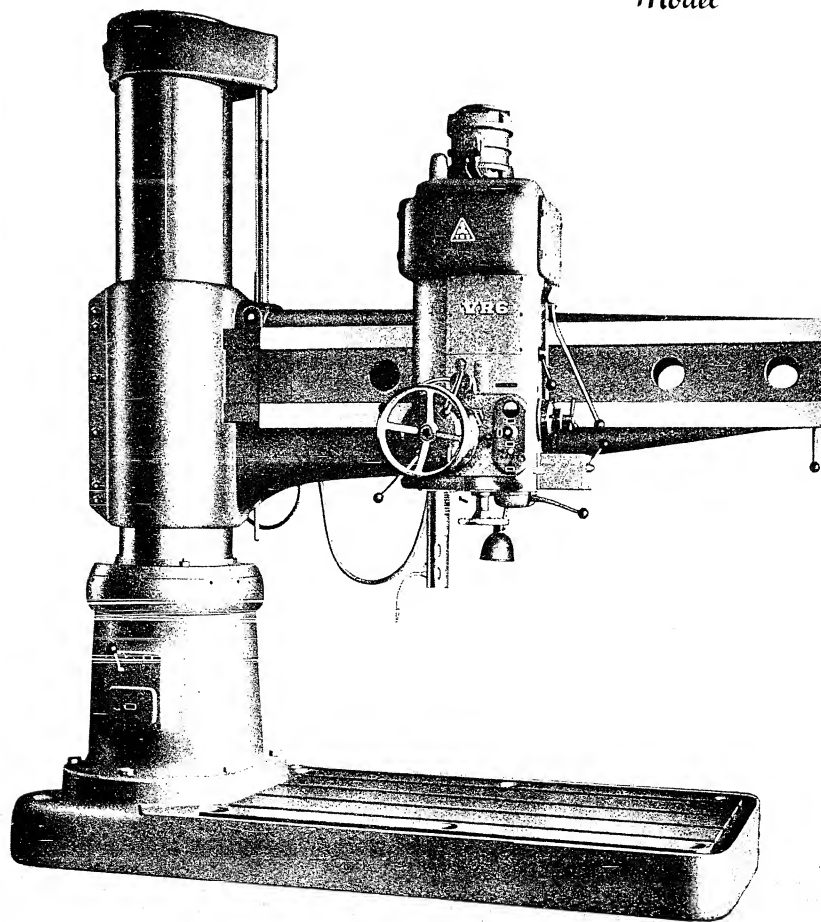
Top working surface	mm 750 x 600
Number, width and distance of T-slots	inches 30 x 24
Side working surface	mm 5 x 28 x 160
Number, width and distance of T-slots	inches 5 x 1 1/2 x 6 3/16
Dimensions of base	mm 750 x 410
Number, width and distance of T-slots	inches 30 x 16
Dimensions of base	mm 2 x 23 x 160
Number, width and distance of T-slots in base	inches 2 x 1 1/2 x 6 3/16
Overall dimensions of table	mm 560 x 460
Weight of table	inches 3 x 30 x 125
	mm 3 x 1 1/2 x 5
	mm 890 x 620 x 500
	inches 25 x 24 1/2 x 22
	degrees 0 to 90
	kg 420
	lbs 925



RADIAL DRILLING MACHINE

Model

6



High output of the machine combined with lasting accuracy ■ Large working surface and wide range of distances between spindle and base allow big and relatively high pieces to be machined as well as very low ones (drilling of holes in metal sheets) ■ Rigidity of the machine within limits established by taking-over conditions in all working positions ■ Simplified and easy operation: small number of conveniently arranged controls concentrated on spindle head ■ Patent guiding arrangement of sleeve by means of ball bearings running in hardened track on column ■ Patent positive securing of arm on column by a nut ■ Spindle head locked on arm by a lever ■ Arm on sleeve and sleeve on column locked by power ■ Control of drilling and elevating motors by single cross-type switch ■ Partial pre-selection of spindle speeds ■ Wide range of spindle speeds, 12 in number ■ Wide range of power feeds of the drilling spindle, 10 in number ■ 3 different ways of feeding the drilling spindle: coarse by hand, fine by hand, by power ■ Attachment for automatic release of the power feed when the required depth of drilling is reached ■ Automatic lubrication of the head-stock unit by the circulation system.

SPECIFICATIONS:

CAPACITY:

Maximum diameter when drilling steel having a tensile strength of 60 kg per square mm . . . mm
 Maximum diameter when drilling cast iron having a tensile strength of 25 kg per square mm . . . mm
 Maximum diameter when boring steel having a tensile strength of 60 kg per square mm . . . mm
 Maximum size of thread cut in steel having a tensile strength of 60 kg per square mm . . .
 Maximum size of thread cut in cast iron having a tensile strength of 25 kg per square mm . . .

Metric English

60 2.35"
 80 3.13"
 300 11.8"
 M 60 2.5"
 M 80 3"

MAIN DIMENSIONS:

Maximum distance, centre-line of spindle to sleeve . . . mm
 Minimum distance, centre-line of spindle to sleeve . . . mm
 Maximum pitch circle of drilled holes . . . mm
 Minimum pitch circle of drilled holes . . . mm
 Maximum and minimum distance, spindle to base . . . mm
 Maximum and minimum distance, spindle to table . . . mm
 Diameter of column . . . mm
 Vertical movement of arm on column . . . mm
 Horizontal movement of spindle head on arm . . . mm
 Swing of arm on column . . .

2000 79"
 430 17"
 440 17.3"
 1340 52.5"
 1830 72 25.5"
 1310 52 20.5"
 475 18.6"
 800 31.4"
 1570 61.4"
 0 360

SPINDLE:

Diameter of end of spindle . . . mm
 Taper in spindle . . . Morse
 Diameter of spindle . . . mm
 Stroke of spindle . . . mm
 Spindle speeds: Number of steps . . .
 standard range . . . r. p. m.
 increased range . . . r. p. m.
 Spindle feeds: Number . . .
 range . . . mm per rev.

85 3.45"
 5 5
 45 1.77"
 380 15"
 12 12
 16 1400
 20 1800
 10 10
 0.031 2 13 820 cuts p.
 inch.

BASE:

Working surface . . . mm
 Number, width and distance of T-slots . . . mm

1940 1080 76 30 42.5"
 3 30 250 3 1.18" 9.8"

DRIVE:

Drilling motor: output speed . . . kW r. p. m.
 Elevating motor: output speed . . . kW r. p. m.
 Clamping motor: output speed . . . kW r. p. m.
 Coolant pump motor: output speed . . . kW r. p. m.

5.7 1400 2820
 3 1410
 0.5 1380
 0.125 2800

DIMENSIONS AND WEIGHTS:

Dimensions of base . . . mm
 Overall dimensions of machine . . . mm
 Working space required . . . mm
 Weight of machine with standard equipment . . . kg
 Weight of machine with packing . . . kg
 Weight of machine with seaworthy packing . . . kg
 Dimensions of seaworthy packing . . . m³
 Volume of seaworthy packing . . . m³

2850 1100 112 3 43.5"
 3135 1100 3745 122 3 112 3 147"
 5900 5960 3750 232 3 234 3 147"
 6400 14 100 lbs
 6900 15 350 lbs
 7500 17 200 lbs
 shipped dismantled
 13.6 480 cu ft

STANDARD EQUIPMENT:

electrical equipment including electric motors, cooling equipment, hooks for lifting of spindle head including bolts, nuts, T-blocks and plugs, 2 reducing sleeves Morse 5/4, 5/3, ejecting wedges, set of spanners, oil can, T-slot cleaner, screw drivers, instruction book.

SPECIAL EQUIPMENT:

2 change wheels for increased range of spindle speeds 20 - 1800 r. p. m.: style Ve 6, box table style Vb 8, universal table style Ve 8, vice style Vd 4.

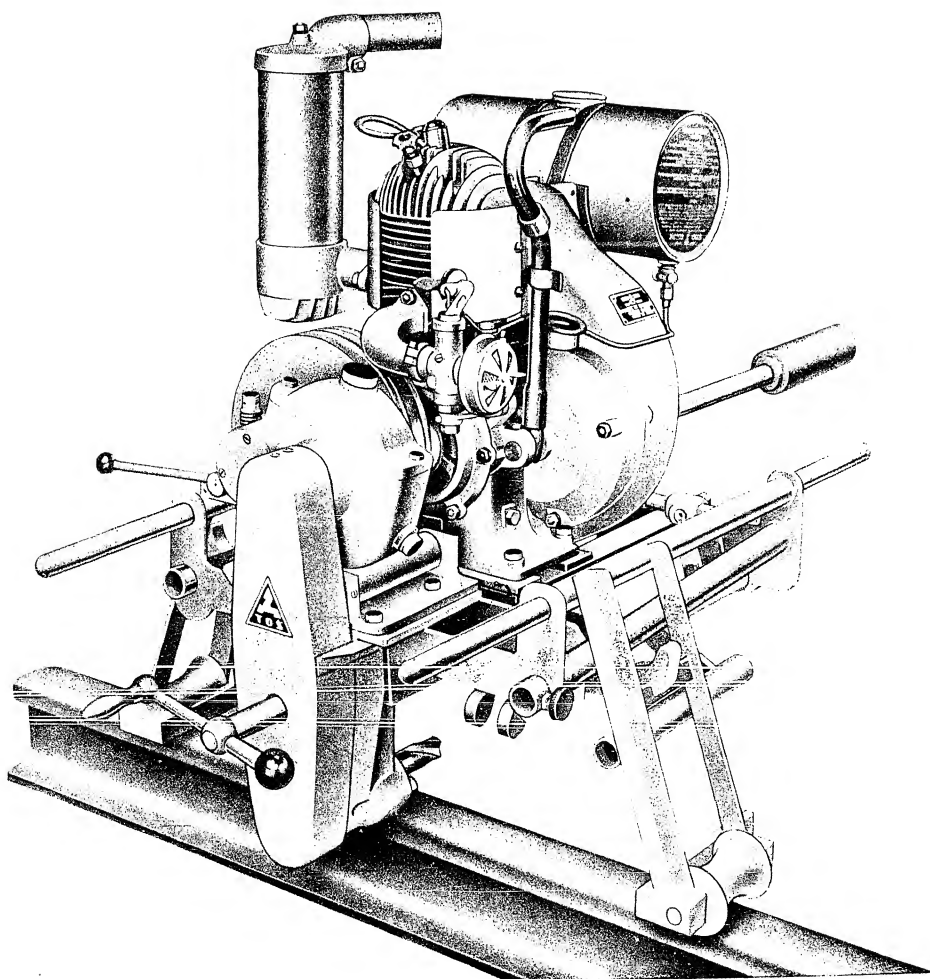
IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT

PRAHA — CZECHOSLOVAKIA

Printed in Czechoslovakia



POWER-OPERATED RAIL DRILL Model MVK

This heavy duty machine of the portable type many times replaces a hand-operated rail drill. It can be used at any place for the drilling of all common rail sections because the holes on the rails are easily and quickly adjustable.

The tool is fed into the cut by a hand crank. The power transmission is controlled by a friction clutch with the aid of which the machine can be instantly put out of action without stopping the motor.

Conveniently located rolls make the machine transportable on the rails. The machine can be readily and quickly adjusted from the transporting to the working position by merely loosening the securing hooks and tilting down the swivel arms.

SPECIFICATIONS:

Taper in spindle	Morse	No. 3
Maximum diameter of drill	mm	32
Over-all dimensions of machine: Length	mm	800
Width	mm	850
Height	mm	1000
Weight of machine	kg	130
Dimensions of box	mm	1250 x 1850 x 1000
Driving motor: of the vertical type, air-cooled, one cylinder, two-stroke, driven by gaso- line, cylinder capacity 310 ccm with centrifugal controller, output 6 HP, speed 2300 R. p. M.		

STROJEXPORT
P R A H A - C Z E C H O S L O V A K I A

Printed in Czechoslovakia

COK 52913 a - 5411 - Stl. 04 - 1433

STAT



HAND - OPERATED RAIL DRILL Model



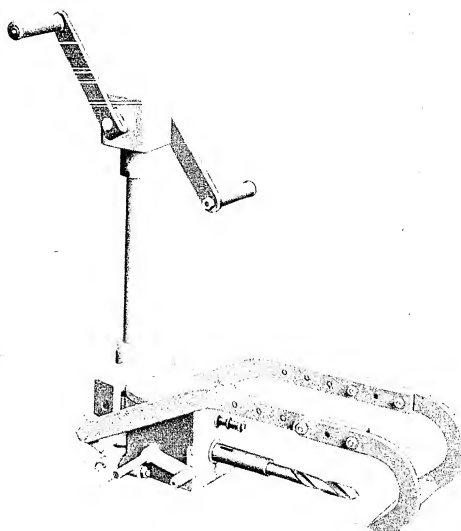
A light, portable machine
for hand drilling of holes
in rails, with automatic
feed motion.



Quick-acting clamping attachment enables the machine to be clamped or removed from the rail in a few seconds. The machine is therefore especially well-suited for railroad repairs during the traffic of trains. Provision is also made for the quick return stroke of the drill by shifting a lever and turning the crank in the opposite direction. The clamping hook can be adjusted to suit the different length of the drill.

SPECIFICATIONS:

Maximum diameter drilled . . . mm	32
Time required for drilling a hole in the rail about . . . minutes	12
Taper in spindle-Morse No.	3
Overall dimensions:	
Height x width x length mm	850x800x700
Weight of machine . . . kg	42



STROJEXPORT

PRAHA — CZECHOSLOVAKIA

ČOK 52930 a 5412

Printed in Czechoslovakia



This is a light, portable,
hand-operated machine for
drilling holes in sleepers
for the rail fastening screws.



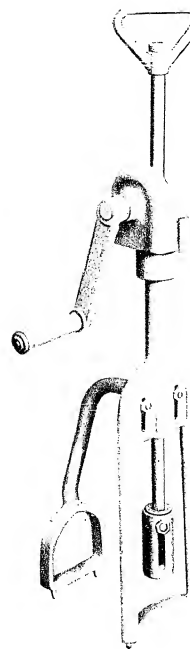
The required drilling depth is set
by an adjustable stop.

As the machine is mounted on the
rail and withdrawn from its work-
ing position within a few seconds
it is especially suitable for rail re-
pairs during the traffic of trains.

SPECIFICATIONS:

Dimensions of machine:

Height	mm	1200
Width	mm	320
Length	mm	300
Diameter of drill shank	mm	13
Weight of machine	kg	12



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PRAHA — CZECHOSLOVAKIA

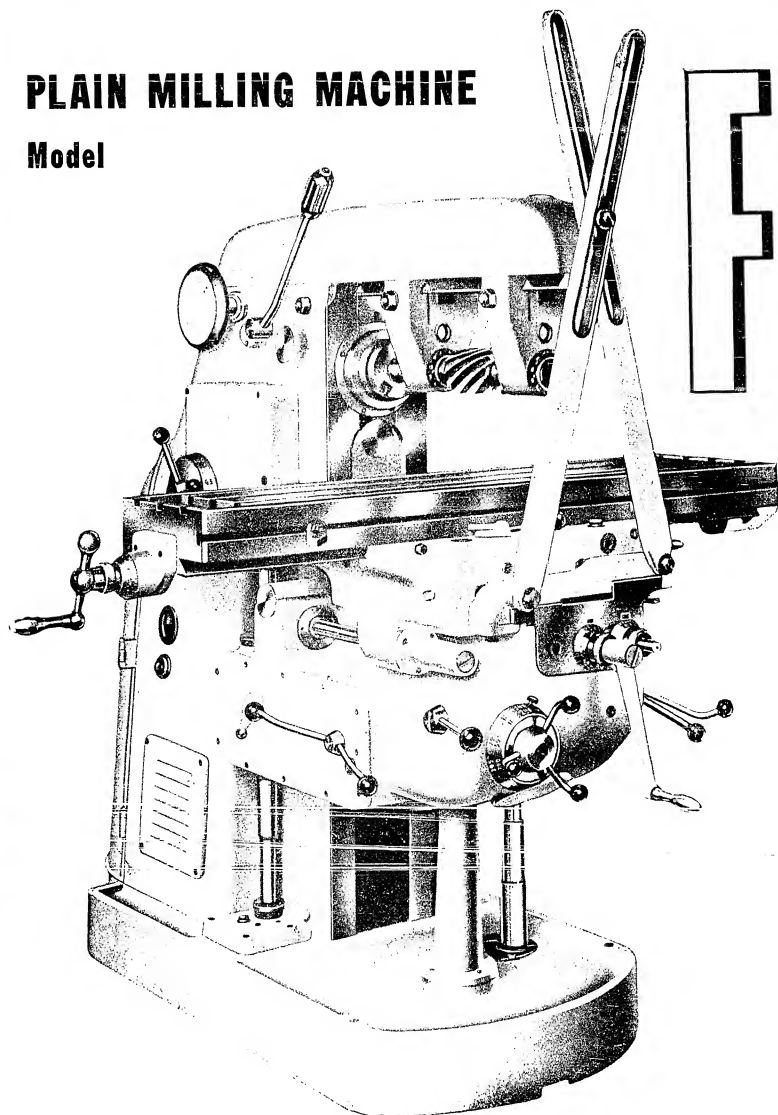
ČOK 52030 a 5412

Printed in Czechoslovakia

STAT

PLAIN MILLING MACHINE

Model



This is a High Duty Precision Machine for heavier milling operations both in the single part and quantity production.

Characteristic Features and Advantages:

The machine is made of carefully selected, inspected, and heat-treated materials.

All parts are interchangeable.

The motor is controlled by a pushbutton in the handle of the main operating lever, a pilot bulb being provided in the handle for signalling the running of the motor.

The spindle speeds are 16 in number and are changed by shifting a single cross lever.

A wide spindle speed range makes the machine suitable for the machining of all classes of materials with various kinds of cutters.

The machine can be supplied equipped with a standard or high spindle speed band.

The available power feeds are 2 x 12 in number and are changed by a single cross lever independently of the spindle rotation.

The power feeds and the rapid traverse are changed in the cross, longitudinal and vertical directions. The feed speed is reduced to the half of its maximum by merely shifting the lever on the feed box.

Automatic central lubrication of the gearbox.

Automatic central lubrication of the knee and feed box.

Central pressure lubrication of the cross slide; all oiling points are lubricated simultaneously by depressing a single lever.

Safe and easily accessible electrical equipment is provided.

Numerous attachments greatly contribute to the versatility of the machine.



a

Specifications:

		Metric	English
Table	Working surface of table (length x width)	mm 1350 x 300	53 x 11.8"
	Number x width x distance between T-slots	mm 3 x 18 x 80	3 x 0.71" x 3.15"
	Longitudinal travel by hand/by power	mm 800/750	31.5"/29.6"
	Cross travel by hand/by power	mm 310/300	12.2"/11.8"
	Vertical travel by hand/by power	mm 485/400	19"/15.7"
Spindle	Diameter of spindle in the front spindle bearing	mm 90	3.54"
	Taper in spindle: standard	70	70
	on request	5	5
	Distance, centreline of spindle to lower surface of overarm	mm 155	6.1"
	Spindle speeds: number	16	16
	standard range r. p. m.	31.5—1000	31.5—1000
Feeds	lower range r. p. m.	20—630	20—630
	Number of feeds	2 x 12	2 x 12
	Range of longitudinal and cross feeds mm/min.	10—790	0.4"—31" per min.
	Range of vertical feeds mm/min.	6—490	0.25"—19" per min.
	Longitudinal and cross rapid traverse mm/min.	2085	82" per min.
Rapid traverse	Vertical rapid traverse mm/min.	1260	49.5" per min.
Drive	Electric motor: speed r. p. m.	1400	1400
	output kW	4.5	4.5
Dimensions and weights	Floor space required: length approx. mm	1850	73"
	width approx. mm	2510	98"
	height approx. mm	1670	67"
	Weight of machine with standard and electrical equipment approx. kg	1900	4200 lbs.
	Weight of electric motor approx. kg	54	120 lbs.
	Weight of domestic packing approx. kg	300	660 lbs.
	Weight of seaworthy packing approx. kg	350	770 lbs.
	Contents boxed m ³	6.45	227 cu. ft.

Caution!

In ordering, specify taper in spindle, spindle speed band, and current characteristics (voltage, phase and frequency). The optional equipment should be ordered with the machine as otherwise the same time of delivery for machine and equipment cannot be guaranteed.

Standard Equipment:

complete electrical installation and equipment including motor, cooling attachment, complete milling arbor dia. 27 mm with taper to suit the spindle, clamping screw, oil can, set of spanners, operating instruction booklet.

Optional Equipment:

additional milling arbors, reducing sleeves, machine vice Model UP 2, swivelling vice Model UO 2 or tilting and swivelling vice Model USO 2, hand operated circular table Model MR 400, dia. 400 mm, power-driven circular table Model MK 400, dia. 400 mm, universal milling attachment Model FHU 2 or vertical milling attachment Model VH 2a, universal indexing attachment Model D 2a, rack indexing attachment Model FP 5, spot light.

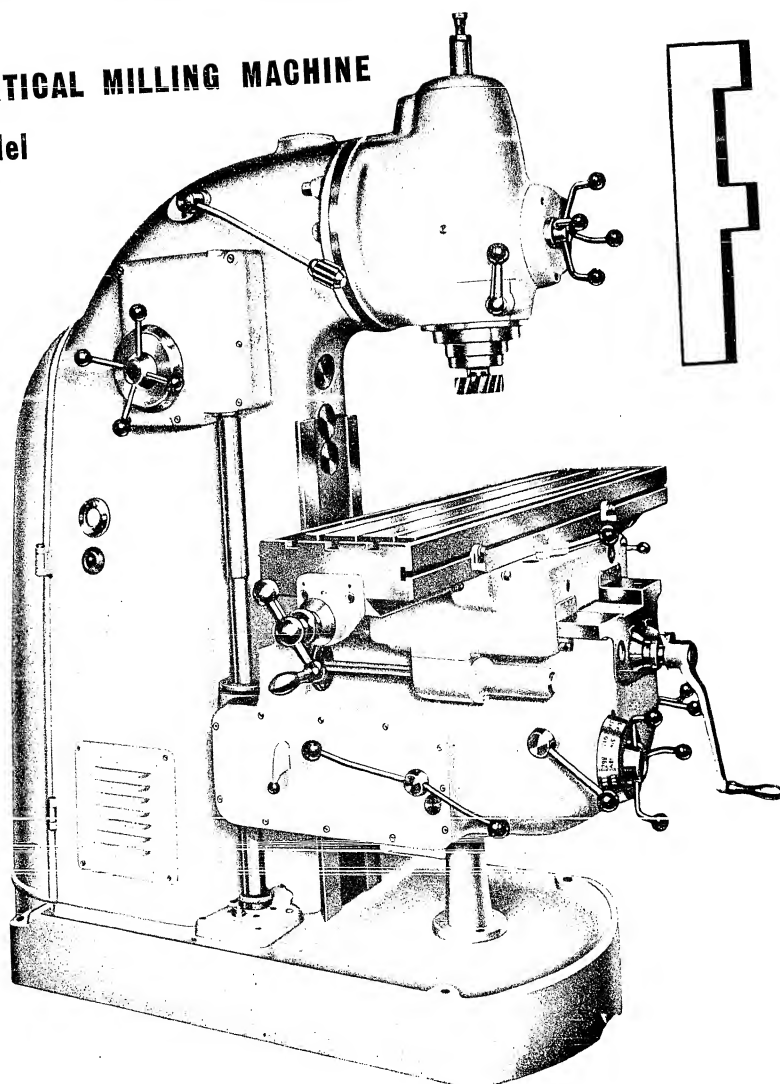
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA - CZECHOSLOVAKIA

STAT

VERTICAL MILLING MACHINE

Model



F 2_a



This is a High Duty Precision Machine for heavier milling operations both in the single part and quantity production.

Characteristic Features and Advantages:

The machine is made of carefully selected, inspected, and heat-treated materials.

All parts are interchangeable.

The motor is controlled by a pushbutton in the handle of the main operating lever, a pilot bulb being provided in the handle for signalling the running of the motor.

The spindle speeds are 16 in number and are changed by shifting a single cross lever.

A wide spindle speed range makes the machine suitable for the machining of all classes of materials with various kinds of cutters.

The machine can be supplied equipped with a standard or high spindle speed band.

The available power feeds are 2 x 12 in number and are changed by a single cross lever independently of the spindle rotation.

The power feeds and the rapid traverse are changed in the cross, longitudinal and vertical directions. The feed speed is reduced to the half of its maximum by merely shifting the lever on the feed box.

Automatic central lubrication of the gearbox and spindle head.

Central pressure lubrication of the cross slide; all oiling points are lubricated simultaneously by depressing a single lever.

Safe and easily accessible electrical equipment is provided.

Numerous attachments greatly contribute to the versatility of the machine.



a

Specifications:

		Metric	English
Table	Working surface of table (length x width)	mm 1350 x 300	53" x 11.8"
	Number x width x distance between T-slots	mm 3 x 18 x 80	3 x 0.71" x 3.15"
	Longitudinal travel by hand/by power	mm 800/750	31.5"/29.6"
	Cross travel by hand/by power	mm 310/300	12.2"/11.8"
	Vertical travel by hand/by power	mm 450/400	17.7"/15.7"
Spindle	Diameter of spindle in the low spindle bearing	mm 90	3.54"
	Taper in spindle: standard	ISA 70	70
	on request	Morse 5	5
	Distance, centreline of spindle to sliding surfaces of column	mm 355	14"
	Vertical adjustment of spindle	mm 75	2.95"
	Spindle head swivels in either direction	45°	45°
	Spindle speeds: number	16	16
	standard speed band r. p. m.	40—1250	40—1250
Feeds	lower speed band r. p. m.	25—800	25—800
	Number of feeds	2 x 12	2 x 12
	Longitudinal and cross feeds for standard speed band	mm/min. 12.5—1020	0.5"—40" per min.
	Vertical feeds for standard speed band	mm/min. 7.5—610	0.3"—24" per min.
	Longitudinal and cross feed for lower speed band	mm/min. 10—790	0.4"—31" per min.
Rapid traverse	Vertical feed for lower spindle speed band	mm/min. 6—490	0.25"—19" per min.
	Longitudinal and cross rapid traverse for standard speed band	mm/min. 2650	104" per min.
	Vertical rapid traverse for standard speed band	mm/min. 1600	63" per min.
	Longitudinal and cross rapid traverse for lower speed band	mm/min. 2085	82" per min.
Drive	Vertical rapid traverse for lower speed band	mm/min. 1260	49.5" per min.
	Electric motor: speed r. p. m.	1400	1400
Dimensions and weights	output kW	4.5	4.5
	Floor space required: length approx.	mm 1850	73"
	width approx.	mm 2510	98"
	height approx.	mm 1920	75"
	Weight of machine with standard and electrical equipment approx.	kg 2040	4500 lbs
	Weight of electric motor approx.	kg 54	120 lbs
	Weight of domestic packing approx.	kg 300	660 lbs
	Weight of seaworthy packing approx.	kg 360	800 lbs
Contents boxed	Contents boxed m ³	6.45	227 cu. ft.

Caution!

In ordering, specify taper in spindle, spindle speed band, and current characteristics (voltage, phase and frequency). The optional equipment should be ordered with the machine as otherwise the same time of delivery for machine and equipment cannot be guaranteed.

Standard Equipment:

Complete electrical installation and equipment including motor, cooling attachment, reducing sleeve, clamping screw, oil can, set of spanners, operating instruction booklet.

Optional Equipment:

Milling arbors, reducing sleeves, machine vice Model UP 2, swivel vice Model UO 2 or swivelling and tilting vice Model USO 2, hand-operated circular table Model MR 400 dia. 400 mm, power-driven circular table Model MK 400, dia. 400 mm, spot light.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

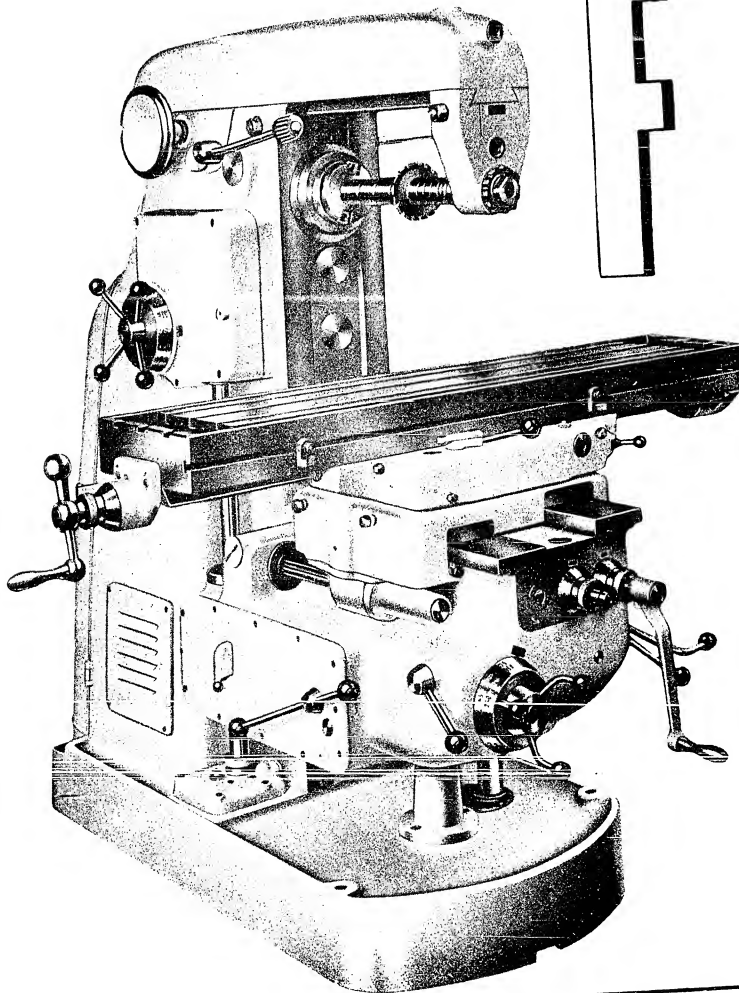
STROJEXPORT PRAHA-CZECHOSLOVAKIA

UNIVERSAL MILLING MACHINE

MODEL

F 2_a

STAT



High efficiency precision machine for heavier milling operations in the single part as well as quantity production.

Use of the most convenient, carefully inspected, heat-treated structural materials.

Absolute interchangeability of all components.

Controlling of motor by a pushbutton on the handle of the starting lever — Signaling the motor run by a bulb on the same handle.

16 spindle speed changes by a single cross lever.

Wide range of spindle speeds, which are suitable for various kinds of both the cutter and the work-piece materials.

Supplying the machine arranged for the standard or for the low spindle speed series.

2x12 power feeds, independent of the spindle rotation, changed by a single cross lever.

Longitudinal, cross and vertical power feeds, as well as rapid traverse.

Reducing the set feed rate to the half by merely shifting the lever on the feed box.

Swivelling table (up to 45 deg. in either direction).

Automatic central lubrication of the gearbox.

Automatic central lubrication of the knee and the feed box.

Central pressure lubrication of all points of the cross slide at the same time by merely depressing a knob on a single lever.

Safe and easily accessible electrical equipment.

Numerous accessories greatly contribute to the versatility of the machine.



a

Specifications:

		Metric	English
Table	Working surface (length x width)	mm 1350 x 300	53" x 11.8"
	Number x width x distance between T-slots	mm 3 x 18 x 80	3 x 0.71" x 3.15"
	Longitudinal travel by hand/by power	mm 750/680	29.5"/27"
	Cross travel by hand/by power	mm 310/300	12.2"/11.8"
	Vertical travel by hand/by power	mm 450/400	17.8"/15.8"
	Swivels in both directions	45°	45 deg.
Spindle:	Diameter in the front bearing	mm 90	3.54"
	Taper in spindle: standard	ISA 70	70
	on request	Morse 5	5
	Distance, centreline of spindle to lower surface of overarm	mm 155	6.1"
	Speeds: number	r. p. m. 31.5—1000	31.5—1000
	standard series	r. p. m. 20—630	20—630
Feeds	Number	2 x 12	2 x 12
	Range of longitudinal and cross feeds	mm/min. 10—790	0.4"—31" per min.
	Range of vertical feeds	mm/min. 6—490	0.25"—19" per min.
Rapid traverse	Longitudinal and cross	mm/min. 2085	82" per min.
	Vertical	mm/min. 1260	49.5" per min.
Drive	Electric motor: speed	r. p. m. 1400	1400
	output	kW 4.5	4.5
Dimensions and weights	Floor space required: length approx.	mm 1850	73"
	width approx.	mm 2510	98"
	height approx.	mm 1670	67"
	Weight of machine with standard accessories and electrical equipment approx.	kg 1960	4350 lbs.
	Weight of electric motor approx.	kg 54	120 lbs.
	Weight of domestic packing approx.	kg 300	660 lbs.
	Weight of seaworthy packing approx.	kg 350	770 lbs.
	Contents boxed	m ³ 6.45	22/ cu. ft.

Caution!

In ordering, specify taper in spindle, spindle speed band, and current characteristics (voltage, phase and frequency). The optional equipment should be ordered with the machine as otherwise the same time of delivery for machine and equipment cannot be guaranteed.

Standard equipment:

complete electrical equipment including motor, cooling attachment, complete milling arbor dia. 27 mm with taper to suit the spindle, clamping screw, two overarm braces, oil can, set of spanners, operating instruction booklet.

Optional Equipment:

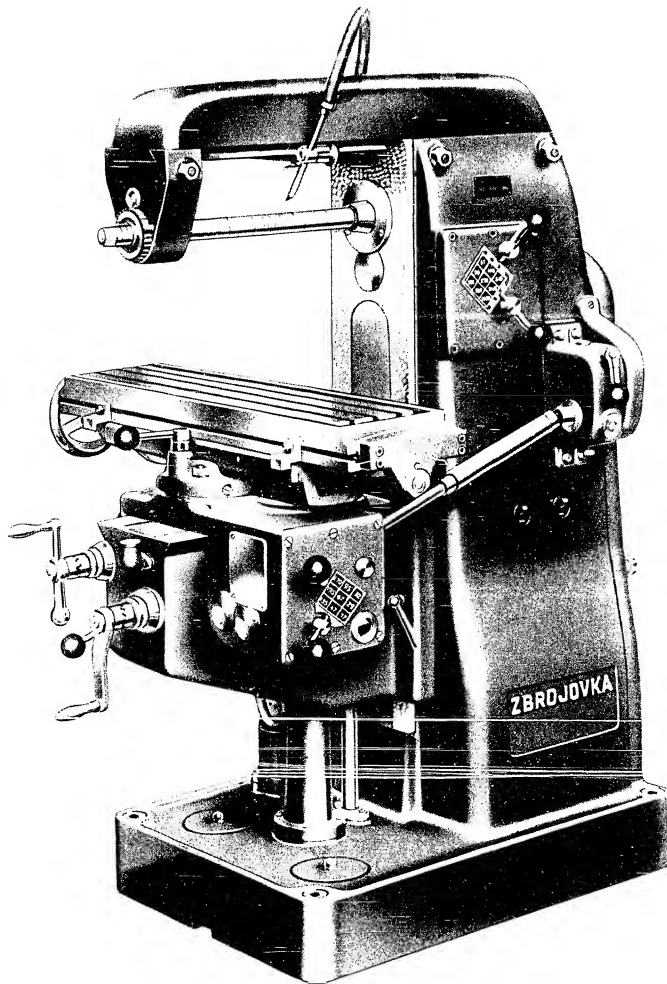
additional milling arbors, reducing sleeves, machine vices: stationary type UP 2, swivelling type UO 2, swing-down and swivelling type USO 2, hand operated circular table model MR 400, dia. 400 mm, power driven circular table model MK 400, dia. 400 mm, universal milling attachment model FHU 2a, vertical milling attachment model VH 2a, universal indexing attachment model D 2a, rack indexing attachment model FP 5, spot light.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA-CZECHOSLOVAKIA

Type F2U UNIVERSAL MILLING MACHINE

STAT



The machine is intended for precision milling operations on small machinery parts and is used to advantage for single piece as well as repetition work.

The high spindle speeds permit light metals to be machined economically.

The machine is equipped with longitudinal power feeds variable within a wide range.

The 9 spindle speeds and 9 power feeds, of which three ranges are available, are easy to change by means of two levers.

The choice of a definite range of spindle speeds and of a definite range of power feeds available to the customer enables him to select a machine correctly equipped with the speeds and feeds most suitable for the contemplated kinds of work.

The variety of additional accessories and attachments supplied for the machine as optional equipment considerably increases its versatility.

Specification

Working surface of table	mm	750 × 200	29 1/2" × 7 7/8"
Number × width × distance between T-slots ...	mm	3 × 14 × 45	3 × 9/16" × 1 3/4"
Swivel of table in either direction			45°
Taper in spindle: standard			ISA 32
optional			Metric 24
optional			No. 3 Morse
Distance, centre line of spindle			
to table: maximum	mm	345	13 1/2"
minimum	mm	25	1"
Number of spindle speeds			9
Available ranges of spindle speeds:			
(range to be selected by customer) range I r.p.m.			67 to 1020
range II r.p.m.			95 to 1450
range III r.p.m.			132 to 2050
Longitudinal travel of table, hand/power	mm	435/425	17 1/8" / 16 3/4"
Cross travel of table, hand	mm	175	6 7/8"
Vertical travel of table, hand	mm	320	12 1/2"
Number of power feeds			9
Available ranges of power feeds: range A mm per min.		12 to 195	15/32" to 7 11/16"
(range to be selected range B mm per min.		17 to 270	21/32" to 10 5/8"
by customer) range C mm per min.		23 to 375	29/32" to 14 3/4"
Motor: power	HP		1.5 to 2
speed	r.p.m.		1400
Belt pulley, dia. × width	mm	120 × 60	4 3/4" × 2 3/8"
Weight of machine with standard equipment	kg	760	1680 lbs
Shipping weight of machine, seaworthy packing ..	kg	920	2030 lbs
Dimensions of packing case	mm	1400 × 1300 × 1700	4'7" × 4'3" × 5'7"
Volume of packing case	m ³	2.95	105 cu. ft.

Standard Equipment:

1 complete milling arbor 22 mm dia, 1 clamping screw, cooling equipment with electric motor and piping, switch with wiring and fuses, grease gun, set of spanners, operating instructions.

Optional Equipment:

Electric motor, belt pulley for electric motor, belt, electric lighting, type DH 10 universal dividing attachment for which a vertically adjustable tailstock, a cross plate and a support for the milling of long objects can be supplied to special order, type PD 2 longitudinal dividing attachment, type SR 2 circular table, type HS 2 vertical milling head, type UH 2 universal milling head.

The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.

Please state in your order the voltage available for the electric motor.

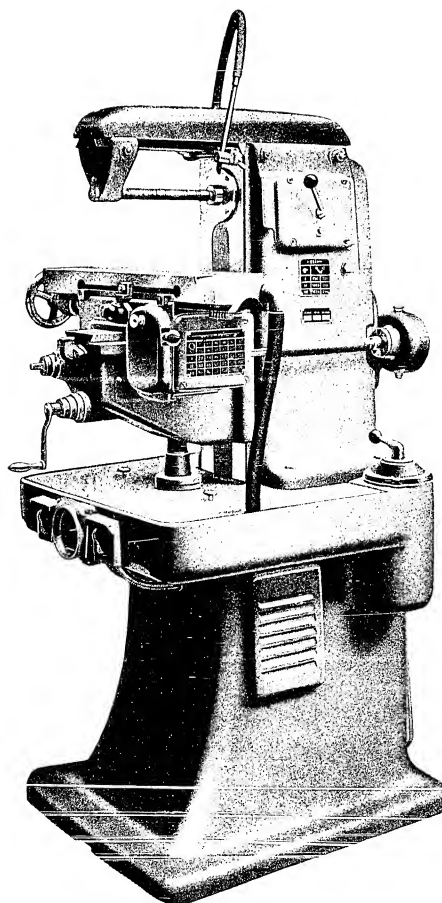
STROJEXPORT

PRAHA - CZECHOSLOVAKIA

F1

HORIZONTAL MILLING MACHINE MODEL F1J

This machine is designed for a general line of light manufacturing work and is equally well-suited both for single part and mass production. The wide spindle speed and feed range enables economical milling of steel and light metals.



THE SPINDLE rotates in Timken precision bearings eliminating radial and axial play. The spindle speeds are changed by the pole changing switch of the three-speed electric motor and by operating the lever of the gear shifting mechanism.

TABLE. The longitudinal table feed is by power and by hand. In the cross and vertical direction the feeds are by hand only. The speeds are changed by two change gears.

LUBRICATION. The mechanism inside the column is lubricated by the oil splash system. The table and knee mechanisms are lubricated from a central oiler.

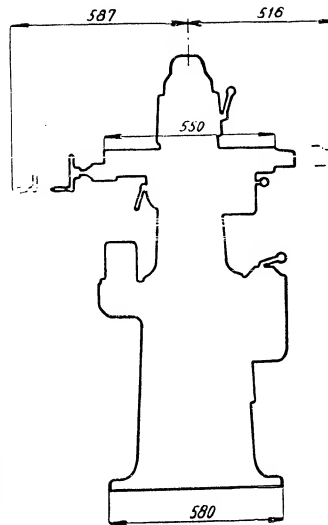
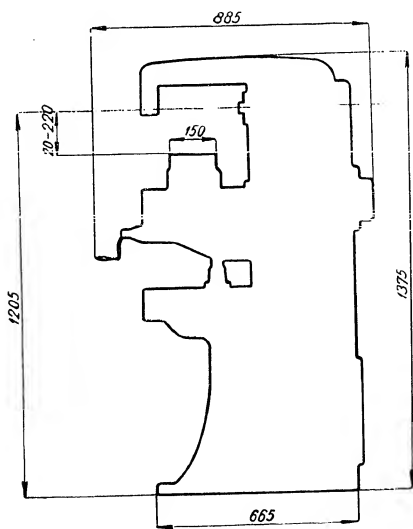
COOLING SYSTEM. The coolant is supplied by an electric pump.

STANDARD EQUIPMENT: Electric motor with pole changing switch, electrical installation, electric coolant pump with piping, milling arbor with metric taper No. 18, dia 16 mm, clamping bolt, grease gun, set of spanners, operator's instruction booklet.

OPTIONAL EQUIPMENT: Vertical Milling Head Model VH1, spot light.

SPECIFICATIONS

Working surface of table	mm	150 × 550	5 7/8" × 21 5/8"
Number width of table T-slots	mm	1 14	1.055"
Longitudinal feed of table by hand/by power	mm	275 × 260	10 3/4" × 10 1/4"
Cross feed of table by hand	mm	125	4 7/8"
Vertical feed of table by hand	mm	200	7 7/8"
Taper in spindle: ISA		32	32
metric		18	18
Morse		2	2
Diameter of spindle in its front bearing	mm	40	1.575"
Maximum minimum distance, centreline of spindle to working surface of table	mm	220 20	8 5/8" 3/4"
Distance, spindle to lower surface of overarm	mm	85	3 11/32"
Distance, spindle end to outer arbor support	mm	245	9 5/8"
Distance, column guide to arbor support	mm	272	10 5/8"
Spindle speeds: 3 ranges, 6 speeds each	R. p. m.	190—1080	190—1080
	R. p. m.	280—1530	280—1530
	R. p. m.	380—2100	380—2100
Number of feeds		6	6
Speed of longitudinal feeds ranging from: A	mm min	17—195	11 16"—7 5/8"
			per minute
B	mm min	24—275	15 16"—10 3/4"
			per minute
Main drive motor: Speed	R. p. m.	1400 940 700	1400 940 700
Output	HP	1.5 0.8 0.55	1.5 0.8 0.55
Weight of machine: with standard equipment	kg	450	1000 lbs.
with packing	kg	530	1170 lbs.
with seaworthy packing	kg	630	1360 lbs.
Contents boxed	m ³	1	36 cu. ft.

**WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!**

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT - PRAHA - CZECHOSLOVAKIA

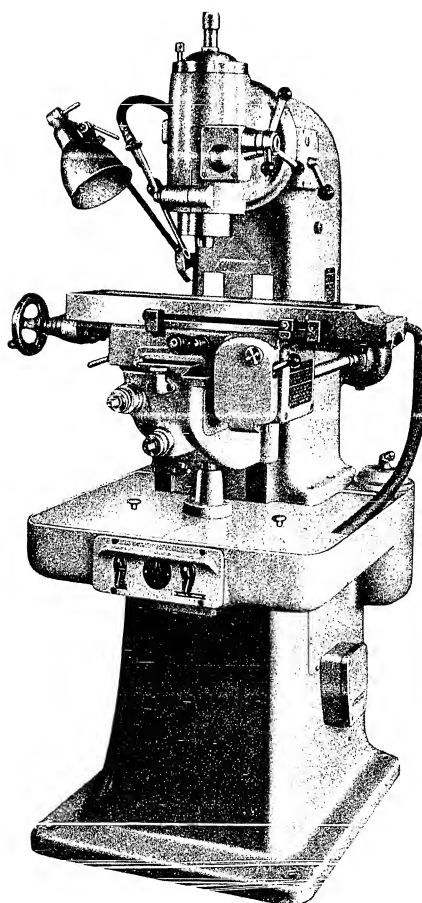
ČOK 520481a -5312

Printed in Czechoslovakia

F1

VERTICAL MILLING MACHINE MODEL FIS

The machine is designed and built to handle smaller work in single part as well as mass production. The wide spindle speed and feed range enables economical machining of steel and light metals.



THE SPINDLE rotates in Timken precision bearings eliminating radial and axial play. The height of the spindle is adjustable and the milling depth can be accurately limited by stops. The spindle head swivels 45° in either direction. The spindle speeds are changed by the pole changing switch of the 3-speed electric motor and by operating the lever of the gear shifting mechanism. The electric motor is mounted on a hinged plate in the lower part of the column.

TABLE. The longitudinal table feed is by power and by hand. The cross and vertical feeds are by hand only. The feed speeds are changed by two change gears.

LUBRICATION. The mechanism within the column is lubricated by the oil splash system. The table and knee mechanism from a central oiler.

COOLING SYSTEM. The coolant is supplied by an electric pump.

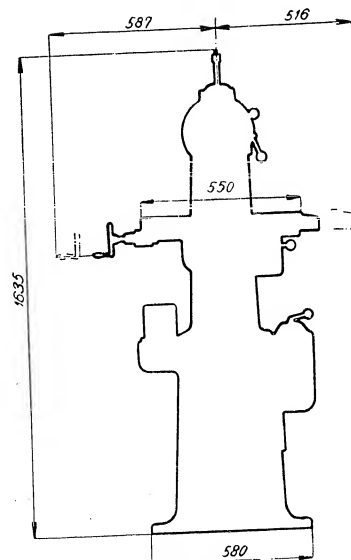
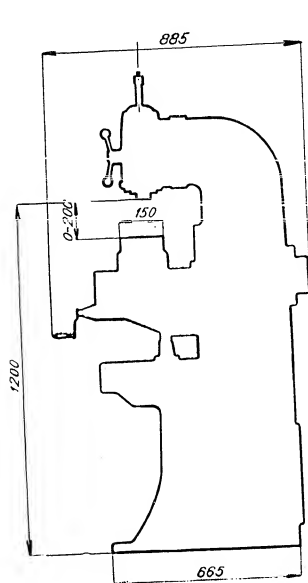
STANDARD EQUIPMENT: Electric motor with pole changing switch, electrical equipment, coolant pump with piping, milling arbor to fit metric taper No. 18, dia 16 mm, clamping screw, hand operated grease gun, set of spanners, operator's instruction booklet.

OPTIONAL EQUIPMENT: Spot light.

SPECIFICATIONS F15

Working surface of table	
Number, width of table T-slots	
Longitudinal table feed by hand, automatic	
Cross table feed by hand	
Vertical table feed by hand	
Taper in spindle: ISA	
metric	
Morse	
Diameter of spindle in the lower bearing	
Vertical adjustment of spindle	
Spindle head swivels in either direction	
Distance, lower spindle end to working surface of table:	
maximum	
minimum	
Distance, centreline of spindle to column guide	
Distance, centreline of spindle to column	
Spindle speeds: 4 ranges, 6 speeds each	
Number of feeds	
Speed of longitudinal feeds ranging from: A.	
B.	
Motor for spindle drive: Speed	
Output	
Floor space required	
Weight of machine: with standard equipment	
with packing	
with seaworthy packing	
Contents boxed	

mm	150 × 550	57 8" × 21 5 8"
mm	1,14	1 0.55"
mm	275 × 260	10 3/4" × 10 1 4"
mm	125	4 7 8"
mm	200	7 7 8"
mm	32	32
mm	18	18
mm	2	2
mm	40	1.575"
mm	60	2 3 8"
mm	45 ⁰	45 ⁰
mm	200	7 7 8"
mm	0	0
mm	165	6 1 2"
mm	195	7 3 4"
mm	190—1070	190—1070
R. p. m.	270—1540	270—1540
R. p. m.	380—2160	380—2160
R. p. m.	540—3070	540—3070
R. p. m.	6	6
mm/min	17—195	11 16" — 7 5 8"
mm/min	24—275	15 16" — 10 3 4"
R. p. m.	1400 940 700	1400, 940, 700
HP	1.5 0.8 0.55	1.5 0.8 0.55
mm	900 × 1100	35 1 2" × 43"
kg	500	1100 lbs.
kg	560	1240 lbs.
kg	680	1500 lbs.
m ³	1.4	50 cu. ft.

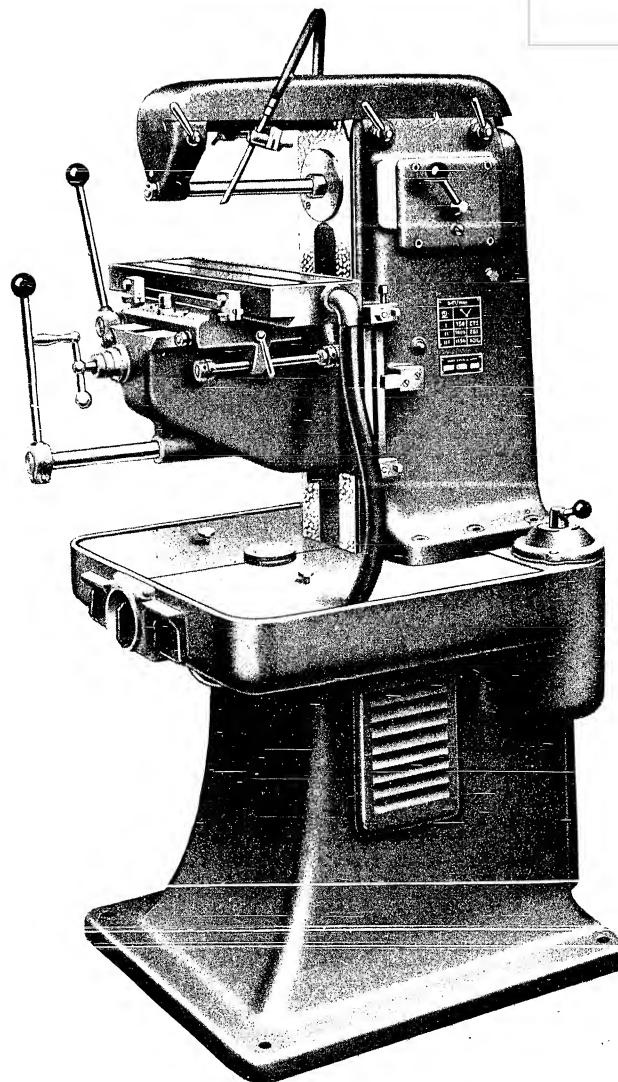


WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!
 As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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STAT

HORIZONTAL MILLING MACHINE Model **F1J2**

The machine is designed and built to handle smaller work especially in the mass production. The wide spindle speed range enables economical machining of steel and light metals.

Spindle. The spindle runs in precision Timken bearings which enable the elimination of the radial and axial play. The spindle speeds are changed by the pole changing switch of the three-speed motor and by operating the lever of the gear shifting mechanism. The motor is located on a hinged plate in the bottom part of the column.

Table. The table feed in all three directions is by hand. The longitudinal and vertical feeds are controlled by levers, the cross feed by a hand crank.

Lubrication. The mechanism inside the column is lubricated by the oil splash system. The knee and table mechanism are lubricated from a central oiler.

Cooling system. The coolant is supplied to the work by an electric pump.

Standard Equipment: Electric motor with pole changing switch, electrical equipment, electric coolant pump, milling arbor with metric taper dia. 16 mm, clamping screw, grease gun, set of spanners, operator's instruction booklet.

Optional Equipment: Spot light.

SPECIFICATIONS

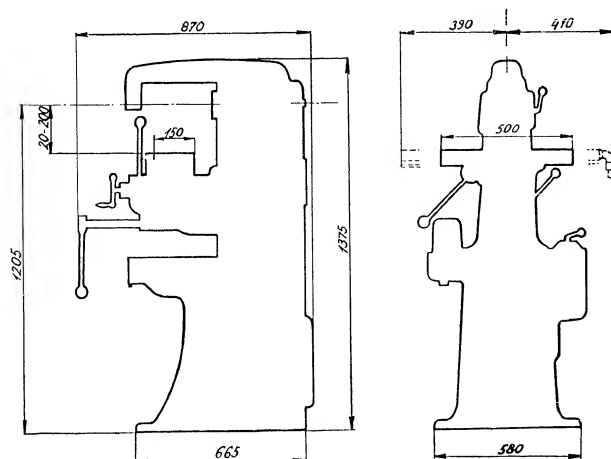
FIJ2

F1J2

Working surface of table	mm	150 × 500	5 7/8" × 19 3/4"
Number width of table T-slots		1 14 mm	1.055"
Longitudinal table feed by hand	mm	250	9 7/8"
Cross table feed by hand	mm	125	4 7/8"
Vertical table feed by hand	mm	180	7 1/4"
Taper in spindle: ISA	No.	32	
metric	No.	18	
Morse	No.	2	
Diameter of spindle in the front bearing	mm	40	1.575"
Distance, centreline of spindle to working table:			
maximum	mm	220	8 5/8"
minimum	mm	20	3/4"
Distance, centreline of spindle to lower overarm ..	mm	85	3 3/8"
Distance, spindle nose to outer arbour support ..	mm	245	9 5/8"
Distance, column guide to outer arbour support ..	mm	272	11 3/4"
Spindle speeds at will: 3 ranges, 6 speeds each ...	r. p. m.	190—1080	
	r. p. m.	280—1530	
	r. p. m.	380—2100	
Main drive motor: Speed	r. p. m.	1400 940 700	
Output	HP	1.5 0.8 0.55	
Weight of Machine: with standard equipment ...	kg	450	1000 lbs
Packed for rail	kg	530	1170 lbs
Packed for overseas	kg	620	1360 lbs
Contents boxed	m ³	1	35 cu. ft.

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IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

**STROJEXPORT**

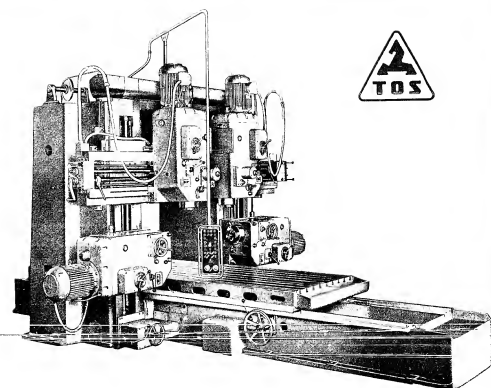
PRAHA - CZECHOSLOVAKIA

SPECIFICATION			
Table			
Clamping surface of table, width x length	mm	1600 x 4000	30" x 160"
Table number		9	
Table width and distance	mm	28 x 160	3,32" x 63/4"
Length of bed	mm	6000	26 feet
Travel of bed	mm	3700	12' 2"
Length of table bed infinitely variable within the range of	mm per min.	25 to 750	1" to 30" per min.
Rapid traverse of table	mm per min.	400	13 feet per min.
Milling Units			
Number of horizontal milling units		2, fixed	
Number of vertical milling units		2, fixed	
Table in spindle	ISA	89	
Diameter of spindle sleeve	mm	160	6 1/4"
Axial movement of spindle sleeve	mm	230	9 1/8"
Number of spindle speeds	r.p.m.	16	
Range of spindle speeds	r.p.m.	10 to 500	
Number of horizontal and vertical milling unit feeds	mm per min.	20 to 500	1/4" to 20" per min.
Range of horizontal and vertical milling unit feeds	mm per min.	1000	23" per min.
Rapid traverse of horizontal and vertical milling units	mm per min.	750	27" per min.
Vertical rapid traverse of cross rail	mm per min.	750	27" per min.
Main Dimensions of Machine			
Distance between bearings	mm	2060	6' 9"
Distance, clamping surface of table to bottom of bed	mm	875	36 1/4"
Distance, clamping surface of table to nose of vertical spindle	mm	110 to 160	4 1/4" to 5"
Distance, clamping surface of table to centre line of horizontal spindles	mm	100 to 170	4" to 6 7/8"
Distance, clamping surface of table to centre line of horizontal spindles	mm	1285 to 1785	51" to 70"
Distance between two horizontal spindles	mm	1920	78"
Distance between two horizontal milling units	mm	1620	64"
Minimum centre-to-centre distance between vertical spindles	mm	1620	64"
Spindle motor (per unit)	kW	16-22	
Motor for table feeds (standard) variable speed 1:20	kW	1 to 15	
Motor for table feeds (optional) variable speed 1:20	kW	4.5	
Motor for milling unit feeds	kW	5.5	
Motor for raising the cross rail	kW	5.5	
Weight of machine	kg	50,000	110,000 lbs

As improvements in design are continuously being made this specification serves for information only and is not to be regarded as binding in detail.

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS

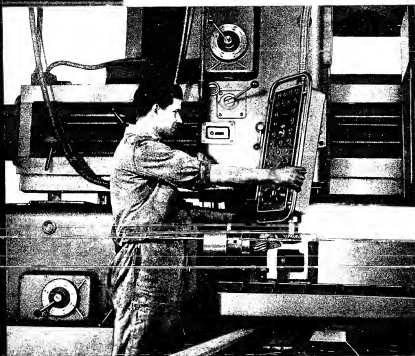
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TYPE **DOUBLE HOUSING MILLING MACHINE**

This high duty precision machine is intended for milling operations, particularly on large machinery parts, and makes possible longitudinal and transverse milling of horizontal, vertical and fluting surfaces. The standard design of the machine is fitted with four fixed milling units. Apart from the standard design the machine can be supplied with various modifications of the number of milling units.

FP20



OUTSTANDING FEATURES

- Particularly rigid design of housings, cross rail and table.
- Wide range of spindle speeds offering operation with high-speed steel tools as well as with cemented carbide tipped tools.
- Infinitely variable adjustment of table feeds.
- Particularly quick table travel.
- Headstocks designed as milling units with individual drive by flange mounted electric motors.
- Independent drives of table feeds and milling unit feeds.
- Automatic travel of spindle extent controlled from portable panel.
- Precision power setting of spindles of vertical milling units to pre-selected position by movement against positive stop.
- Possibility of movement of vertical milling units also by means of hand lever sliding along lead screw.
- Relieved movement of vertical milling units. Substantial part of their weight is carried by ball bearings.
- Automatic clamping of cross rail to guideways of housing in set position.
- Central control of various elements of machine centralized on portable panel.
- Simple operation from right hand as well as left hand side of machine.
- Automatic lubrication of drives.

DESCRIPTION

Each milling unit is an independent assembly with its own drive by a two-speed flange mounted electric motor with an output of 16/22 HP.

The spindle speeds may be changed in the following 16 steps:
10, 16, 20, 25, 31, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315 and 500 r.p.m.

The spindle is mounted on bearings at three points. The front end of the spindle runs in a precision two-row roller bearings with a tapered bore which affords a very fine adjustment of play.

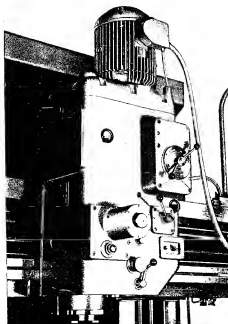
The spindle travel is automatic and operated by an electric motor which is started by a push-button on the portable suspended control panel. The precision power setting of the vertical spindles to their pre-selected positions is done by electron disconnection and movement against a positive stop. The setting can also be done by a hand wheel and is indicated on a dividing ring.

Relieved Weight of Vertical Milling Units. In order that the movement of the milling heads on the cross rail may not be unnecessarily hindered a part of the weight of these units is carried on the guideways by ball bearings.

The Feeds of the Milling Units are mechanical as well as manual. The units may be moved by hand from the right-hand as well as from the left-hand side of the machine. The settings are indicated on a scale or, more accurately, on dividing rings. Appear from that the vertical milling units can be moved by hand by means of a hand lever sliding along the lead screw.

The power feeds can be changed in the following 8 steps:

20, 31, 50, 80, 125, 200, 315, 500 mm per min.
1/4", 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2", 2" per min.



Rapid Traverse. The milling units may also be moved by rapid traverse at a rate of 1000 mm per minute (39" per min.).

Safety Clutch. In case of sudden overload or in the event of striking an obstacle the feed mechanism is protected by a safety clutch. The extreme positions of the milling units are secured by limit switches.

The horizontal milling units are balanced by counterweights arranged inside the housings.

The milling units can be clamped to the guideways of the housings in their set positions.

The Cross Rail carrying the vertical milling units is vertically adjustable by a 750 mm per minute (29" per min.) power rapid traverse. This movement is controlled by push buttons on the portable panel. The cross rail is clamped automatically to the guideways in its set position by means of a motor driven clamping arrangement. A multi-plate safety clutch protects the lifting mechanism against damage by sudden overload or when striking an obstacle. The extreme positions of the cross rail are secured by limit switches.

The Table has flat guideways with adjustable gibs for eliminating the play. The table feeds are transmitted by a worm engaging with the rack of the table. This arrangement ensures a smooth, uniform movement without vibrations and a self-aligning. The feed mechanism is driven by an electric motor fed by a Ward-Leonard set. The rate of table feed is infinitely variable within a range of 25 to 750 mm per min. (1" to 30" per min.) by two push buttons on the portable panel. The selected rate of feed within a certain range is indicated by dials on the portable panel. The table can be moved rapidly in either direction by a 4000 mm per min. (157 feet per min.) rapid traverse. The movement of the table by the power feed can be limited by adjustable stops which, acting through electric switches, stop the feed motor. The table can also be moved by means of hand wheels at either side of the table, the movement of the table being indicated on dividing rings. The table can be locked in its position for transverse milling by tightening the appropriate levers.

The Bed is provided with densely spaced ribs all along its length and is twice as long as the table so that the table does not overlap even in its extreme positions.

The Lubricating System of all moving parts and driving mechanisms is an automatic circulating system. The guideways of the milling units and the lead screw nuts are lubricated by hand pressure lubricators.

The Cooling System. The tools are cooled by the coolant supplied by an electric motor driven pump from a tank arranged at the rear near the bed. The used fluid is collected in sumps at the ends of the table from which it returns to the tank by troughs through screens.

STANDARD EQUIPMENT

2 vertical and 2 horizontal feed milling units, complete electrical equipment including electric motors and Ward-Leonard set with switch box, four milling arbors 50 mm dia. with clamping sleeves, set of spanners, grease gun, checking bridge for re-leveling the bed, set of levelling plates for bed, cooling equipment, lighting of machine, operator's instruction booklet.

SPECIAL DESIGN AND EQUIPMENT

The machine can be supplied by special agreement and at a revised price, with various modifications of the number of milling units and/or with swivelling milling units. Details on application.



20

STAT

SPECIFICATION:

TABLE:

Clamping surface of table	mm	1250 X 3500	50" X 140"
T-slots: number		7	
width and pitch	mm	24 X 145	3/16" X 5 1/2"
Length of bed	mm	7000	23 feet
Feed of table	mm	3200	10 1/2 feet
Rate of table feed infinitely variable within the range of	mm per min.	25 to 750	1" to 30"
Rapid traverse of table	mm per min.	4000	13 feet

HEADSTOCKS:

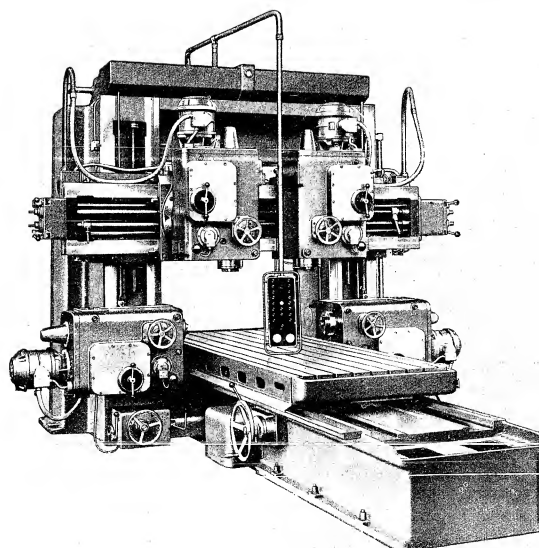
Taper in spindle	ISA	70	
Diameter of spindle sleeve	mm	220	8 11/32"
Axial movement of spindle speeds	mm	250	10"
Number of spindle speeds		19	
Range of spindle speeds,			
series I, on request	r. p. m.	11 to 710	
series II, standard	r. p. m.	14 to 900	
Number of horizontal and vertical headstock feeds		8	
Range of horizontal and vertical headstock feeds	mm per min.	20 to 500	3/4" to 20"
Rapid traverse of horizontal and vertical headstock	mm per min.	1000	3' 3"
Vertical rapid traverse of cross rail	mm per min.	1000	3' 3"

MAIN DIMENSIONS OF MACHINE:

Distance, between housings	mm	1660	5' 5"
Distance, clamping surface of table to bottom of bed	mm	850	34"
Distance, clamping surface of table to nose of vertical spindle	mm	100 to 1250	4" to 50"
Distance, clamping surface of table to centre line of horizontal spindles	mm	90 to 950	3 1/2" to 38"
Distance between both horizontal spindles	mm	900 to 1400	36" to 56"
Distance between both horizontal headstocks	mm	1520	60"
Minimum centre-to-centre distance between vertical spindles	mm	410	16 1/4"
Headstock motor	kW	9/13	
Table feed motor ("Leonard") adjustable 1:30	kW	15	
Headstock feed motor	kW	4.4	
Cross rail elevating motor	kW	4.5	
Weight of machine	kg	39,000	

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

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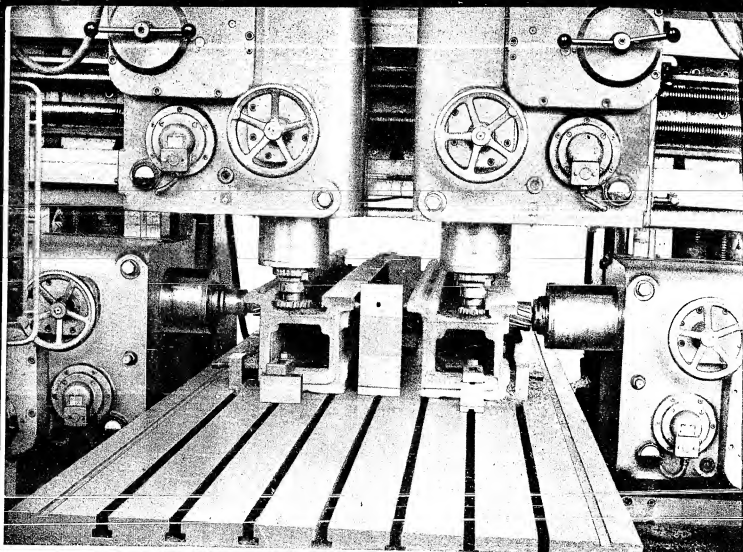
DOUBLE HOUSING
MILLING MACHINE

FP16

This High Duty Precision Machine is intended for milling operations, particularly on large machinery parts and makes possible longitudinal and transverse milling of horizontal, vertical and slanting surfaces.

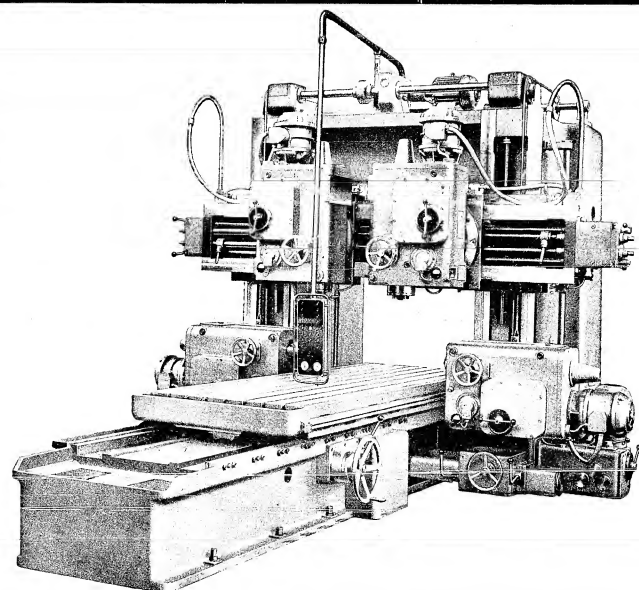
Apart from the standard design with two swivelling vertical headstocks and two fixed horizontal headstocks the machine can be supplied with various numbers and designs of headstocks.

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OUTSTANDING FEATURES

1. Particularly rigid design of housings, cross rail and table.
2. Wide range of spindle speeds allowing operation with high-speed steel tools as well as with cemented carbide tipped tools.
3. Infinitely variable adjustment of table feeds.
4. Particularly quick table travel.
5. Independent drives of individual headstocks as well as of table and headstock feeds.
6. Central control of various elements of machine concentrated on portable panel.
7. Simple operation from right hand as well as left hand side of machine.
8. Automatic clamping of cross rail to guideways of housings in set position.
9. Possibility of movement of vertical spindle heads also by means of hand lever sliding along lead screws.
10. Relieved movement of vertical headstocks. Substantial part of their weight is carried by ball bearings.
11. Independent lubrication of driving mechanism.



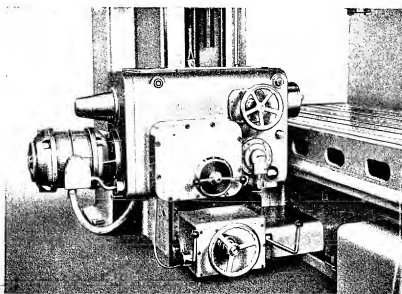
DESCRIPTION

Headstocks: each headstock is an independent unit driven by a two-speed flange mounted electric motor with an output of 12/17 HP. The 16 spindle speeds are changed by means of a single lever. However, in combination with a two-speed motor a total of 19 spindle speeds is available. The machines are normally supplied with a spindle speed range of 14 to 900 r.p.m. On request they may be supplied with a range of 11 to 710 r.p.m. The speeds are arranged in the following rates:
 Series I: 11, 14, 18, 22, 28, 35, 45, 56, 71, 90, 112, 140, 180, 224, 280, 355, 450, 560, 710.
 Series II: 14, 18, 22, 28, 35, 45, 56, 71, 90, 112, 140, 180, 224, 280, 355, 450, 560, 710, 900.
 The three lowest speeds may be engaged at the lower motor speed.

The direction of rotation of the spindle as well as the lower or higher motor speed are controlled by a lever on the switch box.

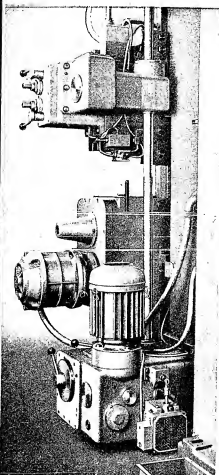
The starting and stopping of spindles is done by push buttons on the portable suspended panel. The Spindle rotates on bearings at three points. The front end of the spindle runs in double precision roller bearings with a tapered bore which permits a very fine adjustment of play. The spindle travel is controlled by a handwheel on the front of the headstock and its value may be easily read on a dividing ring. The spindle sleeve with the spindle can be locked in the set position. The swivelling vertical headstocks swivel 45° either way. A part of the weight of these headstocks is carried on the guideways of the cross rail by ball bearings so they can be moved by a relatively small force.

Fixed horizontal headstock.



The headstock feeds are mechanical as well as manual. The headstocks may be moved by hand from the right-hand and left-hand side of the machine. The settings are indicated on a scale or, more accurately, on dividing rings. Apart from that the vertical headstocks can be moved by means of a hand lever sliding along the lead screws close to the headstocks.

The following 8 ranges of power feeds are available:
20, 31.5, 50, 80, 125, 200, 315, 500 mm per min.
3/4", 1 1/4", 2", 3 1/8", 5", 8", 12 1/2", 20" per min.



The spindle heads may also be moved by rapid traverse of 1000 mm per minute (3' 3" per min.).

The feeds may be controlled from the right as well as left-hand side of the machine. The feeds and the rapid traverse are engaged and disengaged by push buttons on the portable suspended panel. The selection of directions of feed and rapid traverse is controlled by levers on the cross rail or on the boxes at the bottom of the housings.

The feed mechanism is protected by a safety clutch against sudden over-loads or for the case of striking an obstacle. The extreme positions of the headstocks are secured by limit switches.

The horizontal headstocks are balanced by counterweights arranged inside the housings. The headstocks can be clamped to the guideways of the housings in their set position. The cross rail carrying the vertical headstocks is vertically adjustable by a 1000 mm per minute (3' 3" per min.) power rapid traverse. This movement is controlled by push buttons on the portable panel. The cross rail is clamped automatically to the guideways in its set position by means of a motor driven clamping arrangement. A multi-plate safety clutch protects the lifting mechanism against damage by sudden over-load or when striking an obstacle. The extreme positions of the cross rail are secured by limit switches.

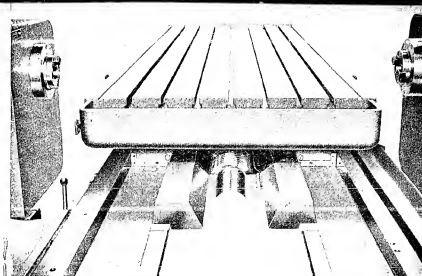
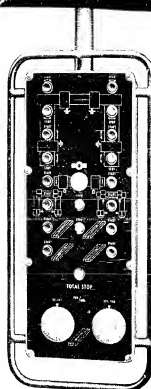
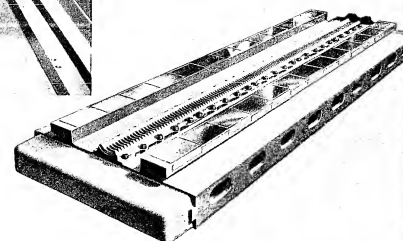


Table in rear extreme position.



View of reversed table with rack.

The table has flat guideways with adjustable gibs for eliminating the play.

The table feeds are transmitted by a worm engaging with the rack of the table. This arrangement ensures a smooth, uniform movement without vibrations and is self-locking.

The feed mechanism is driven by an electric motor fed by a Ward-Leonard set. The rate of table feed is infinitely variable within a range of 25 to 750 mm per min. (1" to 30" per min.) by two push buttons on the portable panel.

The selected rate of feed within a certain range is indicated by dials on the portable panel.

The table can be moved rapidly in either direction by a 4000 mm per min. (13 feet per min.) rapid traverse.

The feeds and the rapid traverse are started and stopped by push buttons on the portable panel.

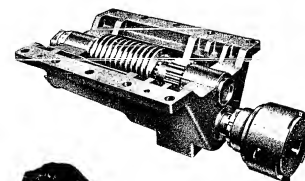
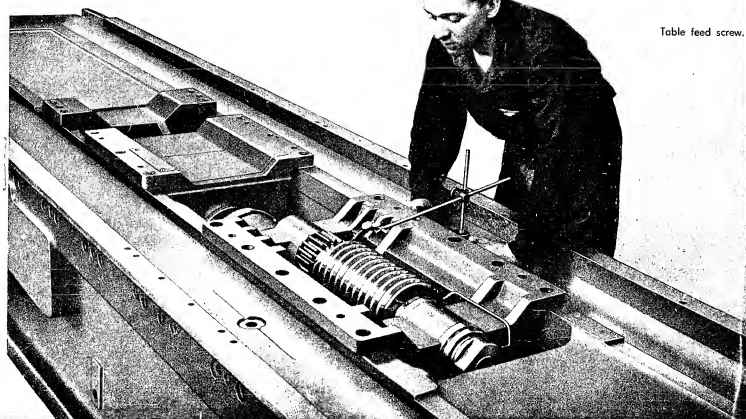
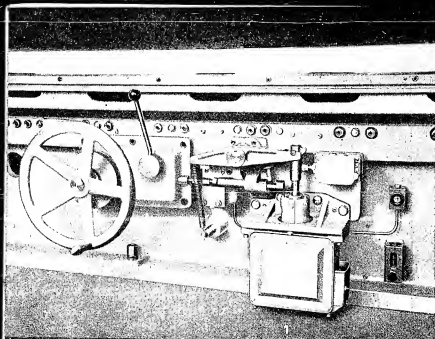


Table feed screw.



Rear view of cross rail.



The movement of the table by the power feed can be limited by adjustable stops which, acting through electric switches, stop the feed motor.

The table can also be moved by means of hand wheels at either side of the table, the movement of the table being indicated on dividing rings.

The table can be locked in its position for transverse milling by tightening the appropriate levers.

The bed is provided with densely spaced ribs all along its length and is twice as long as the table so that the table does not extend beyond it even in its extreme positions.

The lubrication of the headstocks is automatic, by the circulation system. Oil is supplied to all oiling points from a distributor filled by an electric motor driven pump. The guideways of the headstocks, and the lead screw nuts are lubricated by hand by pressure lubricators.

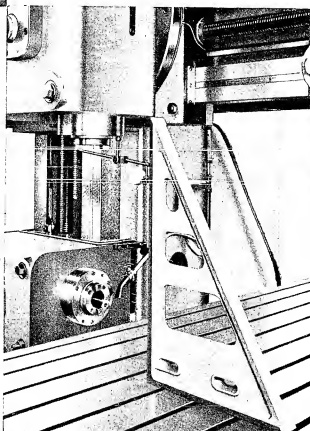
The lubrication of the cross rail gear box is also automatic and the required oil is supplied by a piston pump.

The rotating parts of the feed box are lubricated partly by an oil spray produced by the gears running in an oil bath, partly by an oil pump.

The lubrication of the table is also automatic.

An electric motor driven oil pump supplies oil to the centre of the guideways of the bed. From there it is pressed through oil grooves in the table guideways and returns to a central tank through filters arranged at either end of the bed. The oil pressure is adjustable to ensure that the oil will not be forced out of the guiding surfaces.

Careful inspection in the course of manufacture and assembly ensures a high degree of precision of work done by this machine.



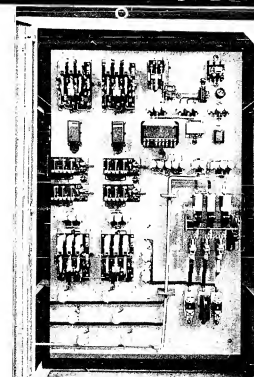
Wheel for hand feed of table and lever for engaging the hand feed, which simultaneously controls feed and rapid traverse interlocking device.

Cooling. The tools are cooled by the coolant supplied by an electric motor driven pump from a tank arranged at the rear near the bed. The used fluid is collected in sumps at the sides of the table from which it returns to the tank by troughs through screens.

STANDARD EQUIPMENT:

Two swivelling vertical headstocks, two fixed horizontal headstocks, complete electrical equipment including electric motors and Ward-Leonard set with switch box, four milling arbors dia. 50 mm with clamping screws, set of spanners, grease gun, checking bridge for re-leveling the bed, set of levelling plates for bed, cooling equipment, fluorescent lamp, operator's instruction booklet.

Panels with electrical equipment.



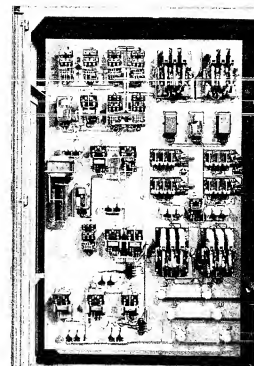
SPECIAL DESIGN AND EQUIPMENT:

The machine can be supplied in the following versions to special order and at a revised price:

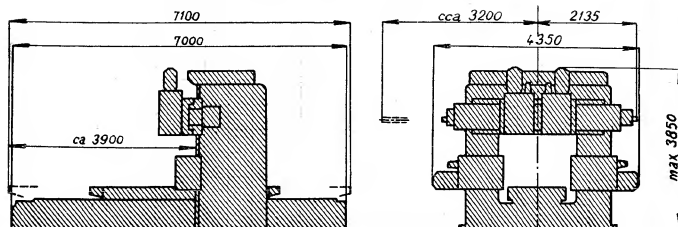
1. With two fixed horizontal headstocks and one swivelling vertical headstock.
2. With two swivelling vertical headstocks.
3. With fixed vertical headstock.
4. With swivelling horizontal headstocks arranged in any combination as required.

Adjustable milling head attached to spindle sleeve of vertical headstock and permitting transverse angular milling.

Spindle extension for depth milling.



DIMENSIONAL DRAWING OF MACHINE MODEL 1:100



DESCRIPTION

Type	FA3 H	FA3 U	FA3 V
Working surface of table:			
width	97 1/4"	97 1/4"	97 1/4"
length	49 1/4"	49 1/4"	49 1/4"
T-slots:			
number	3	3	3
width	8 1/4"	8 1/4"	8 1/4"
distance	2 3/16"	2 3/16"	2 3/16"
Longitudinal travel of table:			
hand	32"	32"	32"
power	31 1/2"	31 1/2"	31 1/2"
Cross travel of table:			
hand	11"	9 1/4"	11"
power	10 3/4"	8 1/4"	10 3/4"
Vertical travel of table:			
hand	16"	16"	16"
power	15 3/4"	15 3/4"	15 3/4"
Swivel of table in either direction		45°	—
Taper in spindle:			
standard	ISA 44	ISA 44	ISA 44
optional	Metric 32	Metric 32	Metric 32
optional	No. 4 Morse	No. 4 Morse	No. 4 Morse
Distance, centre line of spindle to table:			
minimum	16 3/4"	14 3/4"	—
maximum	5 1/8"	3 1/4"	—
Distance, nose of spindle to top of table:			
ISA/Metric maximum	—	—	17 3/4"
(with spindle sleeve moved forward) ISA/Metric minimum	—	—	0"
Distance, nose of spindle to inside of arbor support	18 3/4"	18 3/4"	—
Distance, centre line of arbor to underside of overarm	5 1/4"	5 1/4"	—
Distance, centre line of spindle to guideways of column	—	—	11 3/4"
Maximum swivel of spindle head in either direction	—	—	45°
Vertical adjustment of spindle	—	—	2 3/16"
Spindle speeds, number	12	12	12
standard range	45 to 2000	45 to 2000	45 to 2000
high range	60 to 2800	60 to 2800	60 to 2800
Feeds:			
number	13	13	13
longitudinal and cross, range	3 1/16" to 35 1/16"	3 1/16" to 35 1/16"	3 1/16" to 35 1/16"
vertical, range	1/32" to 3 1/4"	1/32" to 3 1/4"	1/32" to 3 1/4"
Rapid traverse: longitudinal and cross	9 1/2"	9 1/2"	9 1/2"
vertical	2 7/16"	2 7/16"	2 7/16"
Electric motor for spindle drive:			
speed	1430	1430	1430
power	5.7	5.7	5.7
Feed motor:			
speed	1380	1380	1380
power	1	1	1
Floor space required by machine	8'10" X 5'9 1/2"	8'10" X 5'9 1/2"	8'10" X 5'11"
Height of machine	4'11"	4'11"	5'0 1/2"
Weight of machine with standard equipment	3310	3420	3200
Shipping weight, railway packing	3860	3970	4080
seaworthy packing	4410	4520	4630
Volume of packing case	154	164	220

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS
The machines are continuously being improved upon. The data given in this prospectus are therefore not binding in detail.



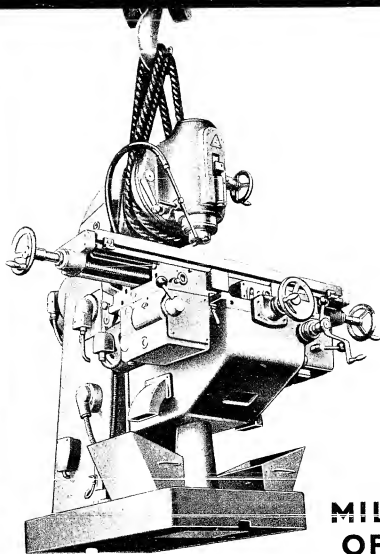
Milling Machines

SERIES FA3

STROJEXPORT

Z B R O J O V K A

3



MILLING MACHINES OF THE FA3 SERIES?

Whether new production is being organized or existing machinery equipment supplemented all the demands placed upon the products being contemplated have to be taken into consideration. The most important among them is efficient production which makes imperative the choice of heavy duty machine tools the setting and attendance of which requires a minimum of preparatory time, machine tools, the capacity and operating possibilities of which satisfy the conditions for the use of the most modern cutting tools, machine tools on which the required precision of shape and high grade of surface finish of the work-piece can be attained.

In the field of milling machines Zbrojovka machines, which are distinguished by their advanced design and high class workmanship, satisfy all these requirements. The medium sizes of them form the FA3 series.

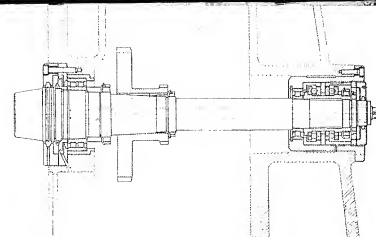
These are: the type FA3H horizontal milling machine intended for simple milling operations, the type FA3V vertical milling machine with a swivelling spindle head and vertical adjustment of the spindle, with a drive for the power feed of a rotary table, and the type FA3U universal milling machine with a tilting table and equipment for the power drive of the spindle of a universal dividing head and of a rotary table as well as for work requiring a rack milling attachment.

When suitable cutting conditions exist the machines guarantee quiet and accurate work without vibrations or shocks even at the highest outputs. Their wide range of spindle speeds as well as of rates of feed affords coarse as well as fine machining of all commonly used metals and alloys and is a guarantee of the economical utilization of these machines.

DESCRIPTION

The spindle mounting of particular precision ensures a high precision of the machined surface.

The spindle runs, at its front end, in a precision double-row roller bearing with a tapered bore which affords a very fine adjustment of the play in the bearing. Similarly the high precision of the other bearings of the spindle ensures an exceptional precision of its mounting.

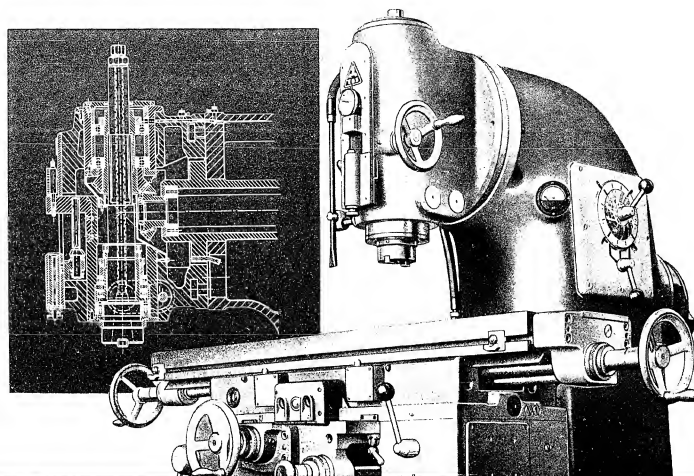


To attain precision of work and a high grade of surface finish when working with a tool remote from the spindle horizontal and universal milling machines are equipped with an overarm which forms a rigid unit with the arm braces.

The overarm carries two arbor supports of the milling arbor. In the supports oil tanks are arranged for the lubrication of the guide bushes.

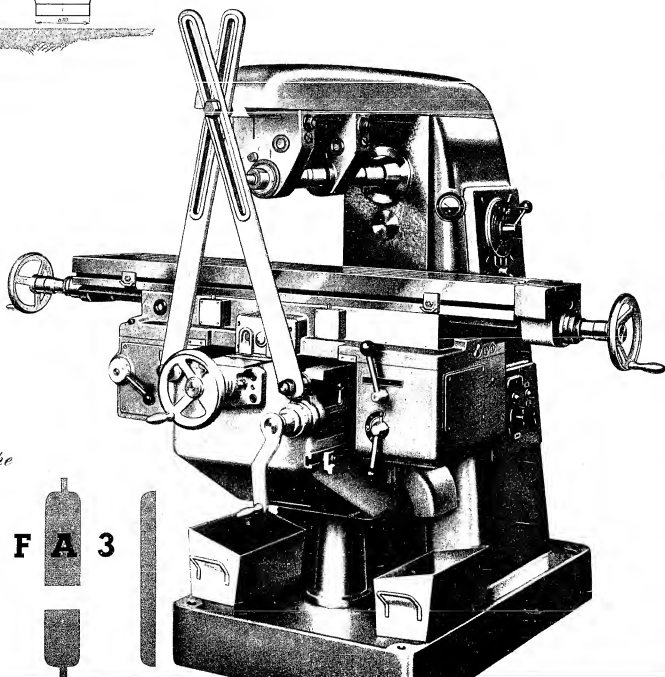
An accurate setting of the vertical movement of the spindle of vertical machines is made possible by a telescopic stop which can be used in the same way as a positive stop.

The spindle is moved up and down by a hand wheel arranged at the right-hand side of the spindle head. The amount of movement may be read on an indexing ring. The milling depth may also be adjusted by inserting slip gauges or according to a dial indicator built into the upper stop block. The spindle sleeve with the spindle is locked in the adjusted position by means of a handle fitted at the left-hand side of the spindle head. The spindle head swivels up to 45° in either direction and can be locked in any desired position.





HORIZONTAL MILLING MACHINE



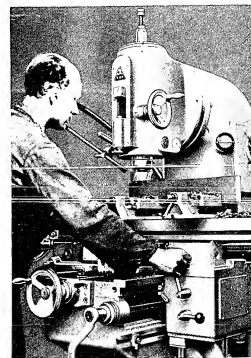
type

F A 3

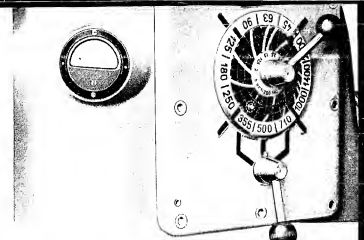
An important accessory for determining a suitable spindle speed is the calculator by the setting of which the speed corresponding to the material being machined, the material of the tool, the diameter of the tool and the required grade of surface finish is directly engaged.

The wide range of speeds permits all kinds of material, from high tensile strength steel to light metals, to be machined economically.

The machines are normally equipped with a range of spindle speeds of 45 to 2000 r. p. m. and can, on special request, be supplied with a higher range of spindle speeds of 63 to 2800 r. p. m. This affords the choice of a machine equipped with the correct spindle speeds to suit the contemplated kinds of work.



The spindle is driven by an independent flange-mounted electric motor. The motor is fitted at the rear wall of the housing. The motor and, with it, the spindle are started by a push-button. A second push-button serves for stopping the spindle and applying the brake. The push-button is fitted on the cross slide. The spindle brake is applied as long as the "STOP" push-button is being held depressed. The brake effect is produced by direct current supplied by a dry rectifier. The direction of rotation of the spindle is controlled by the main switch fitted at the right-hand side of the housing.

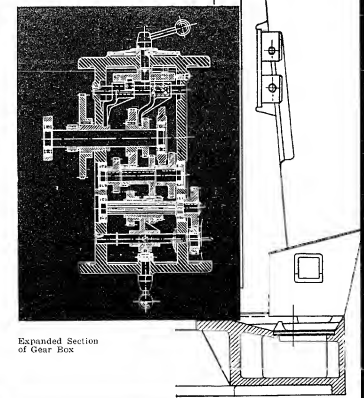


The operating load of machine may be checked on the built-in ammeter.

The machines are equipped with longitudinal, cross and vertical power feeds.

To obtain quick movements of the table the machines are also equipped with rapid traverses in all three directions. Easy engagement of the rapid traverses and instantaneous and accurate changeover from them to the working feeds is made possible by multi-plate clutches of a novel design in the transmission.

Highly accurate disengagement of power feeds and rapid traverses in any direction and sense is made possible by adjustable stops which stop the feed motor by means of electric switches.

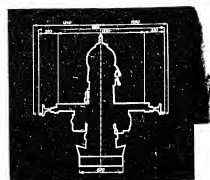
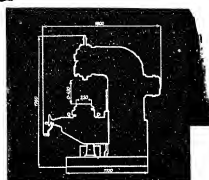
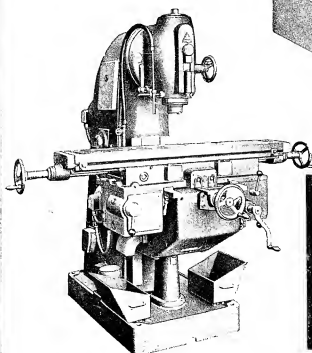
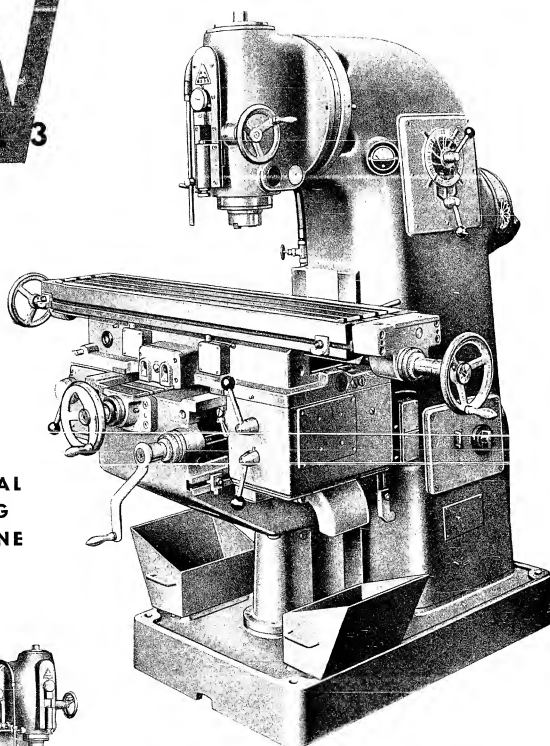


Expanded Section of Gear Box

V

F 4 3

VERTICAL MILLING MACHINE



The feeds and rapid traverses are driven by an independent flange-mounted electric motor.

The motor is attached at the rear to the feed box which is fitted at the left-hand side of the cross slide. The motor is protected against overload by thermal overload relays. The transmission of the feed box and table is protected against overload by two safety clutches.

The feeds are changed by two gears in the feed box which is of an entirely new design.

All the gears of this box are of the same design and have the same number of teeth so that the coefficient of the geometrical progression is the same for all the rates of feed.

The wide range of power feeds arranged in 13 steps permits a suitable power feed to be engaged.

The rates of feed available in the longitudinal and transverse directions are:

$\frac{1}{16}$ in, $\frac{1}{8}$ in, $\frac{1}{4}$ in, $\frac{1}{2}$ in, $3 \frac{1}{8}$ in, $4 \frac{1}{2}$ in, $6 \frac{1}{8}$ in, $8 \frac{1}{4}$ in, $12 \frac{1}{2}$ in, $17 \frac{1}{4}$ in, $24 \frac{1}{2}$ in, $35 \frac{1}{2}$ inches per min

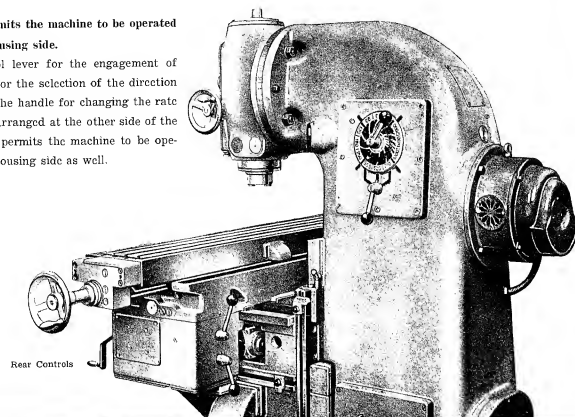
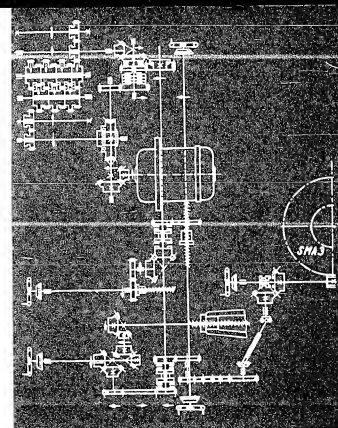
The rates of vertical feed correspond to $\frac{1}{4}$ of the rates of longitudinal feed.

Easy engagement of power feeds and rapid traverses in all three directions in either sense by means of two hand levers considerably speeds up operation.

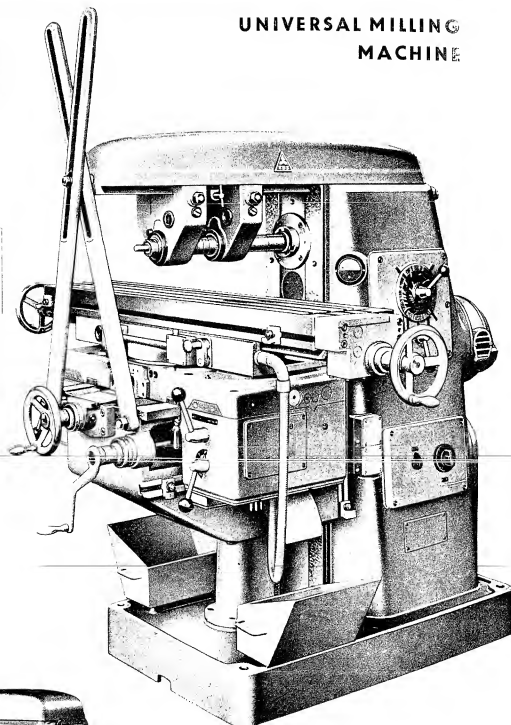
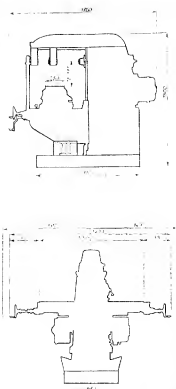
The longitudinal, transverse and vertical direction of feed are selected by the lower control lever at the right-hand side of the cross slide. The selected feed is engaged by the upper control lever. The same lever also serves for engaging the rapid traverses. The rate of feed is changed by a single lever at the left hand side at the front of the machine.

Dual control permits the machine to be operated also from the housing side.

The main control lever for the engagement of feeds, the lever for the selection of the direction of the feed and the handle for changing the rate of feed are also arranged at the other side of the cross slide. This permits the machine to be operated from the housing side as well.



UNIVERSAL MILLING MACHINE



Dimensions of Table of work table



Screw for Adjustment of Vertical Guideways

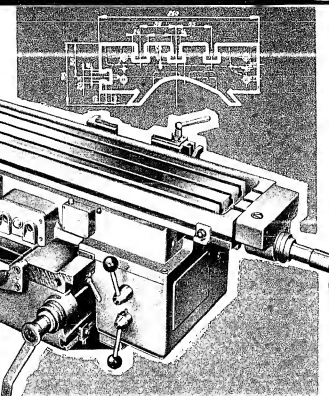
The particularly rigid design of the housing and knee ensures precision of work without vibrations or shocks even at the highest loads of the machines.

Also contributing to the high rigidity is the mounting of the work table in long guideways of the cross slide which is turn is guided on wide surfaces of the knee. Any play in the guideways of the knee, the cross slide, the longitudinal table and in the vertical guideways of the knee can easily be eliminated by adjusting the appropriate guideway gibs.

The work table and the upper part of the cross slide of the universal machine can be swivelled up to 45° in either direction. The table can be locked in the swivelled position by means of four screws which are accessible from the front of the machine.

The machines are fitted with a cooling equipment with an independent electric motor driven pump which supplies coolant from a tank in the base to the tool. The used coolant, together with the chips of the machined material, is drained from the working table and cross slide through broad channels into the wide spaces inside the knee from which it runs into two oil pockets on the sides of the knee. Here the oil is separated from the chips by screens and returns into the tank in the base where it is cleaned by several settling stages.

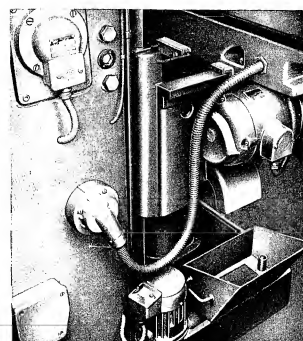
The reliable electrical equipment includes, apart from the motor driving the spindle, the feed motor, the coolant pump motor and the lubricating pump motor, also the rectifier supplying direct current to produce a brake action in the spindle motor, the contactor combinations for the starting of the motors, the thermal overload relays and the fuses.



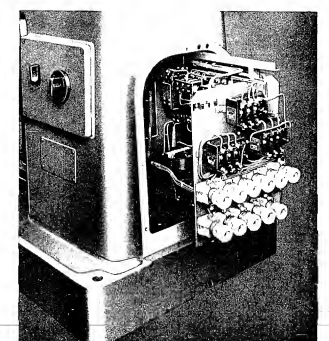
The carefully designed lubricating system of the entire machine ensures the life of the machine and its reliability in operation for many years. The whole drive of the spindle as well as the gear change assembly are lubricated by a gear pump driven by its own electric motor. The level gears of the drive and all the bearings of the spindle of vertical machines are automatically lubricated with oil.

The gears, bearings and other parts of the feed box are lubricated with circulating oil by means of an independent piston pump which, when the distributor is depressed by hand, distributes oil, on the one hand, to all the bearings of the feed drive in the table, on the other hand to the guideways on the knee and cross slide.

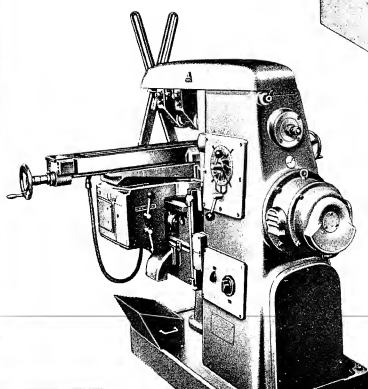
The screw for the vertical movement is automatically abundantly lubricated and cooled by an oil bath and, when the vertical feed or rapid traverse is engaged, also with circulating oil.



Motor for Drive of Feeds



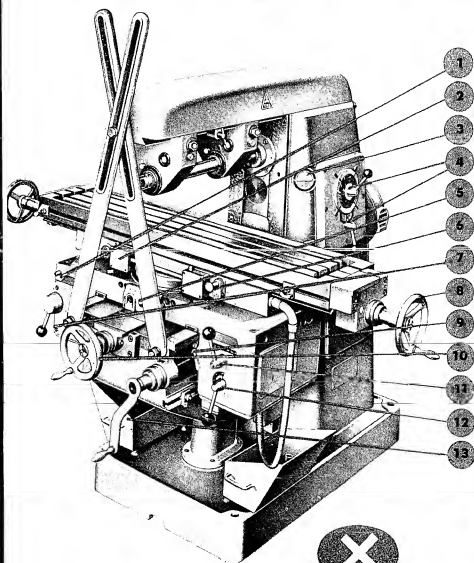
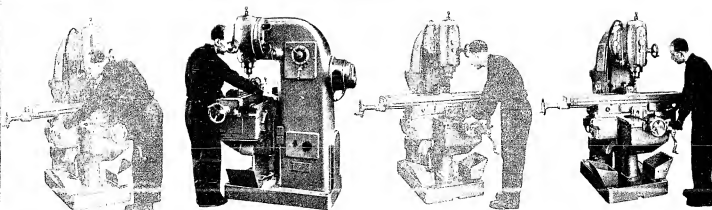
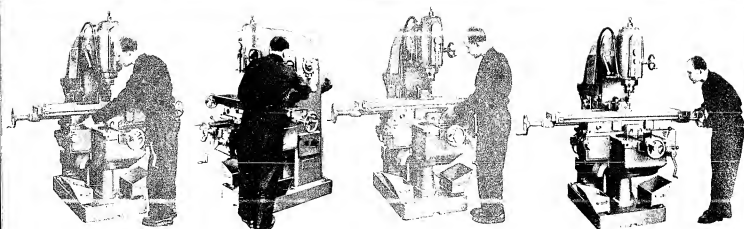
Electrical Equipment



type

F

3



- CONTROLS**
- 1 Handle for Lubricating or Longitudinal and Cross Feedways of Table
 - 2 Stop of Longitudinal Feed
 - 3 Ammeter
 - 4 Solenoid Speed Change Lever
 - 5 Push Buttons for Starting and Stopping of Spindle
 - 6 Lever for Engagement of Helical Table Drive
 - 7 Hand Wheel for Changing of Feed
 - 8 Hand Wheel for Longitudinal Table Feed
 - 9 Hand Wheel for Cross Feed
 - 10 Hand Wheel for Helical Table Feed
 - 11 Hand Wheel for Reversing and Overhauling of Feed
 - 12 Hand Wheel for Selection of Direction of Feed
 - 13 Handle for Vertical Movement of Head
 - 14 Hand Wheel for Vertical Movement of Head
 - 15 Hand Wheel for Selection of Spindle Speed



All controls of the machines are accessible from one point



OPTIONAL EQUIPMENT

The great variety of attachments and equipment supplied for the FA3 series of milling machines to special order permits a number of milling operations to be performed which otherwise would require the purchase of further common as well as special machines.

They are:

The Type DII Universal Dividing Head

for which a tailstock adjustable for height is supplied for the milling of long objects, and a right angle plate can be supplied to order against extra charge.

The Type PDA3 Rack Milling Attachment

The Type HVA3 Vertical Milling Attachment

The Type HVA3 Universal Milling Attachment

The Type SVA3 Circular Milling Attachment

with Power Drive

The Type SVA3 Circular Milling Attachment

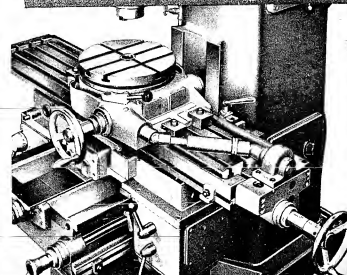
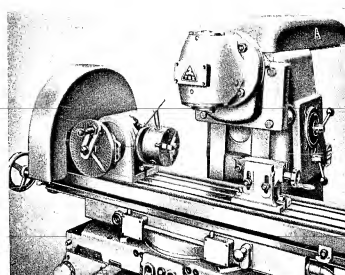
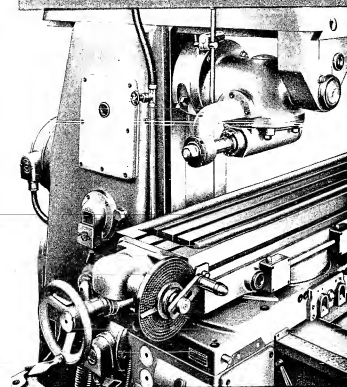
with Hand Drive

In addition to these attachments the following equipment is available: Machine vices, milling arbors of various clamping diameters and lengths, reducing sleeves and collet chucks for the chucking of cylindrical shank tools.

A detailed description of attachments and equipment will be included in the catalogue of optional equipment for the FA Series of milling machines which is now under preparation.

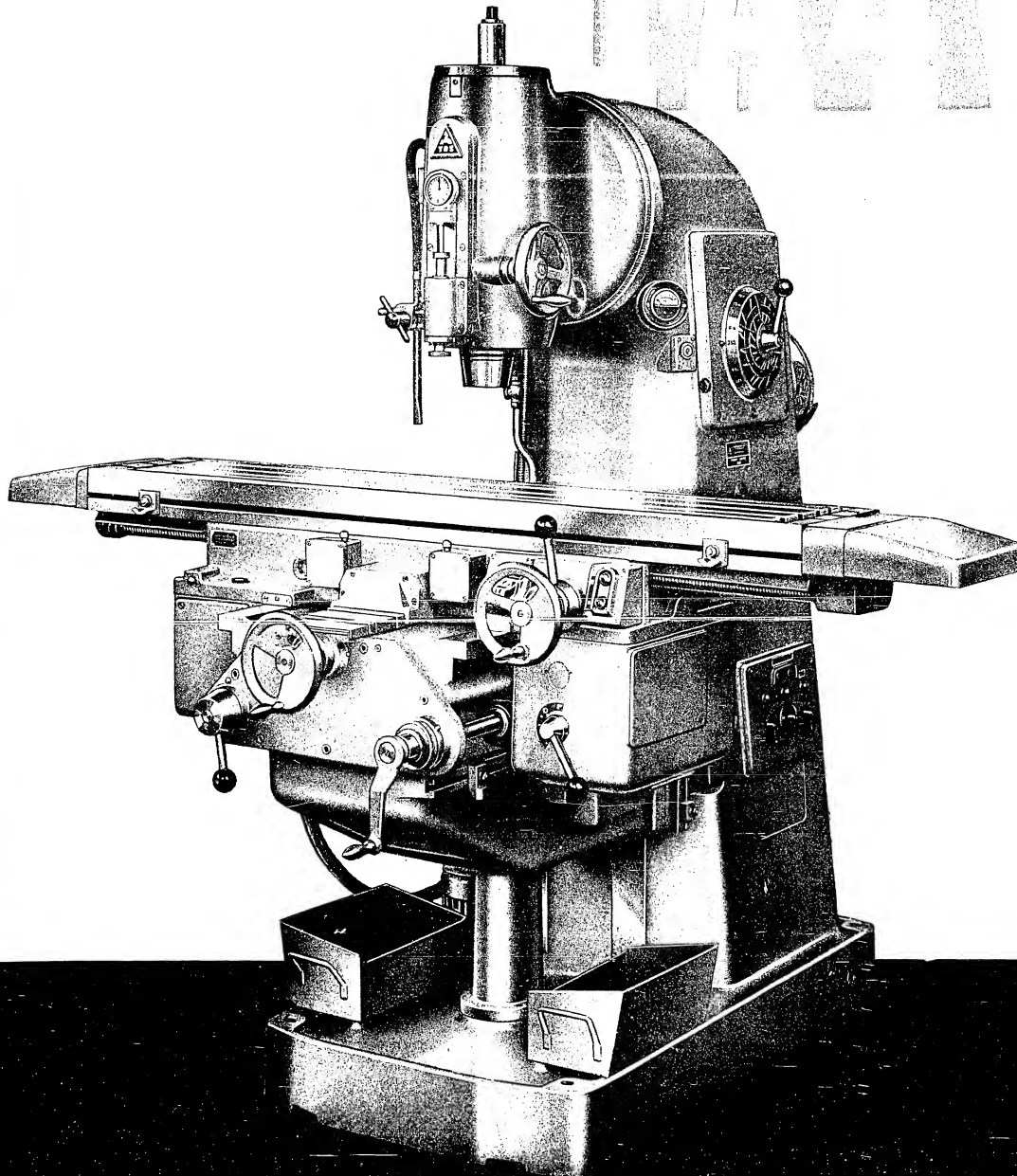
STANDARD EQUIPMENT

The following equipment is supplied with the machine and included in its price: Milling arbor with clamping bolt, cooling equipment, complete electrical equipment, grease gun, set of spanners, operating instructions.



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VERTICAL MILLING MACHINE Model FA4V



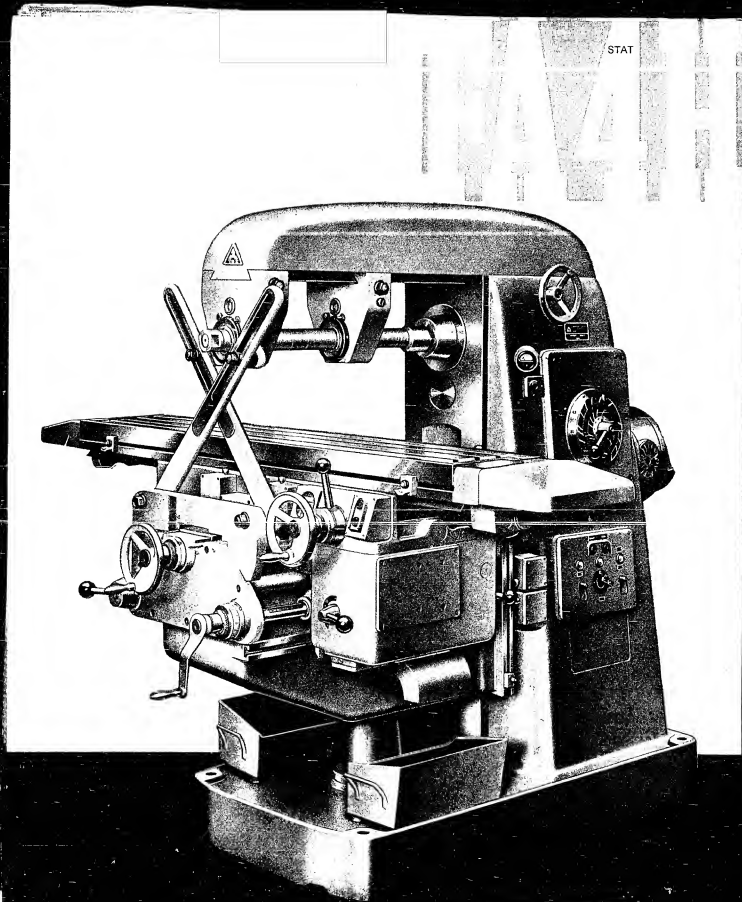
SPECIFICATIONS

Table: Working surface: width	mm	315
length	mm	1600
Number of T-Slots		5
Width x distance of T-Slots	mm	18 x 70
Longitudinal travel: by hand	mm	1010
by power	mm	1000
Cross travel: by hand	mm	365
by power	mm	355
Vertical movement: by hand	mm	435
by power	mm	425
Spindle: Standard taper hole	ISA	70
On demand metric	No.	5
Morse	No.	5
Distance from spindle nose to top of table: maximum ISA/metric	mm	500/480
minimum ISA/metric	mm	0
Distance from centerline of spindle to column	mm	550
Head swivels in both directions	mm	45°
Vertical adjustment of spindle	mm	85
Spindle speeds: number	r. p. m.	12
standard series	r. p. m.	32-1400
high series	r. p. m.	45-2000
Feeds: Number		15
Range of longitudinal and cross feeds	mm/min	10-1200
Range of vertical feeds	mm/min	2.5-315
Power rapid traverse: Longitudinal and cross	mm/min	2000
Vertical	mm/min	800
Drive: Main motor: Speed	r. p. m.	1430
Input	HP	7.5
On demand: Input	HP	10
Feed motor: Speed	r. p. m.	1390
Input	HP	1.5
Shipping data: Floor space required	mm	2070 x 3120
Weight of machine: with standard equipment	kg	2690
with railway packing	kg	2995
with seoworthy packing	kg	3665
Contents boxed	m³	8.9

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operating instructions.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!



STROJEXPORT PRAHA-CZECHOSLOVAKIA

PLAIN MILLING MACHINE Model FA4H



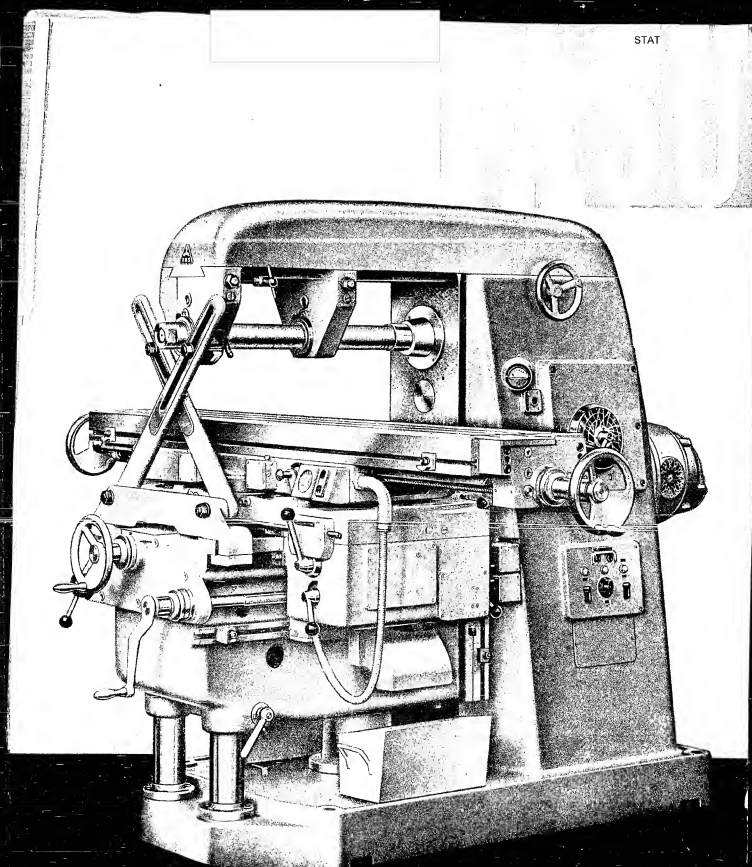
SPECIFICATIONS

Table: Working surface: width	mm	315
length	mm	1600
Number of T-slots		3
Width x distance of T-slots	mm	18x70
Longitudinal travel: by hand	mm	1010
by power	mm	1000
Cross travel: by hand	mm	365
by power	mm	355
Vertical movement: by hand	mm	435
by power	mm	425
Spindle: Standard taper hole	ISA	70
On demand metric	No.	50
Morse	No.	5
Distance from centerline of spindle to top of table: maximum	mm	480
minimum	mm	45
Distance from spindle nose to inside of arbor support	mm	640
Distance from centerline of arbor to underside of overarm	mm	155
Distance from column to brace	mm	760
Spindle speeds: number		12
standard series	r. p. m.	32—1400
high series	r. p. m.	45—2000
Feeds: Number		15
Range of longitudinal and cross feeds	mm/min	10—1250
Range of vertical feeds	mm/min	2.5—315
Power rapid traverse: Longitudinal and cross	mm/min	3200
Vertical	mm/min	800
Drive: Main Motor: Speed	r. p. m.	1430
Input	HP	7.5
On special order: Input	HP	10
Feed motor: Speed	r. p. m.	1390
Input	HP	1.5
Shipping data: Floor space required	mm	2080x3120
Weight of machine: with standard equipment	kg	2770
with railway packing	kg	3005
with seaworthy packing	kg	3470
Contents boxed	m ³	7

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operating instructions.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!



STROJEXPORT PRAHA-CZECHOSLOVAKIA

UNIVERSAL MILLING MACHINE Model FA5U



SPECIFICATIONS

Table: Working surface: width	mm	400
length	mm	2000
Number of T-Slots		3
Width x distance of T-Slots	mm	20 x 90
Longitudinal travel: by hand	mm	1260
by power	mm	1250
Cross travel ¹⁾ : by hand	mm	410
by power	mm	400
Vertical movement: by hand	mm	410
by power	mm	400
Table swivels in both directions		45°
Spindle: Standard taper hole	ISA	70
On demand metric	No.	50
Morse	No.	5
Distance from centerline of spindle to top of table: maximum	mm	450
minimum	mm	40
Distance from spindle nose to inside of arbor support	mm	820
Distance from centerline of arbor to underside of overarm	mm	160
Distance from column to brace	mm	930
Spindle speeds: number		20
standard series	r. p. m.	18—1400
Feeds: Number		15
Range of longitudinal and cross feeds	mm/min	10—1250
Range of vertical feeds	mm/min	2.5—315
Power rapid traverse: Longitudinal and cross	mm/min	3200
Vertical	mm/min	800
Drive: Main motor: Speed	r. p. m.	1440
Input	HP	15
On demand: Input	HP	20.5
Feed motor: Speed	r. p. m.	1410
Input	HP	3.25
Shipping data: Floor space required	mm	4200 x 2550
Weight of machine: with standard equipment	kg	4700
with railway packing	kg	5150
with seaworthy packing	kg	5550
Contents boxed	m ³	13.5

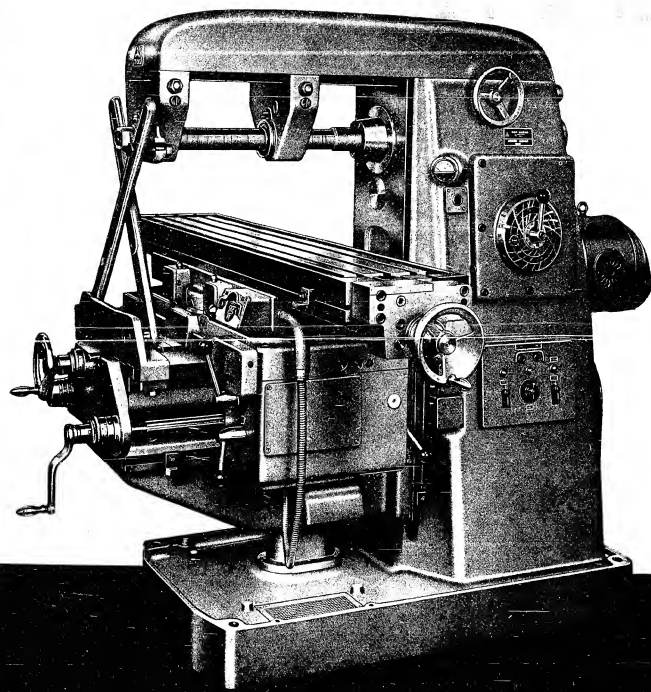
¹⁾ With arm brace 290 mm by hand and 280 mm by power.

STANDARD EQUIPMENT: Milling arbor with clamping bolts, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operating instructions.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

STAT



STROJEXPORT PRAHA-CZECHOSLOVAKIA

UNIVERSAL MILLING MACHINE Model FA4U



SPECIFICATIONS

Table: Working surface: width	ins.	12.4
length	ins.	63
Number of T-slots	ins.	3
Width x distance of T-slots	ins.	0.71 x 2.76
Longitudinal travel: by hand	ins.	39.8
by power	ins.	39.4
Cross travel: by hand	ins.	12.2
by power	ins.	11.8
Vertical movement: by hand	ins.	14.2
by power	ins.	15.7
Table swivels in both directions	ins.	45°
Spindle: Standard taper hole	ISA	70
On demand metric	No.	50
Morse	No.	5
Distance from centerline of spindle to top of table: maximum	ins.	16.7
minimum	ins.	0.6
Distance from spindle nose to inside of arbor support	ins.	25.2
Distance from centerline of arbor to underside of overarm	ins.	6.1
Distance from column to brace	ins.	29.8
Spindle speeds: number	r. p. m.	12
standard series	r. p. m.	32-1400
high series	r. p. m.	45-2000
Feeds: Number	ins./min.	15
Range of longitudinal and cross feeds	ins./min.	13/32-49
Range of vertical feeds	ins./min.	0.1-12.5
Power rapid traverse: Longitudinal and cross	ins./min.	126
Vertical	r. p. m.	31.5
Drive: Main motor: Speed	r. p. m.	1430
Input	HP	7.5
On demand: Input	HP	10
Feed motor: Speed	r. p. m.	1390
Input	HP	1.5
Shipping data: Floor space required	ins.	6'9 1/2" x 10'4"
Weight of machine: with standard equipment	lbs.	6200
with railway packing	lbs.	6350
with seaworthy packing	lbs.	7800
Contents boxed	cu. ft.	268

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operating instructions.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

STROJEXPORT PRAHA-CZECHOSLOVAKIA

VERTICAL MILLING MACHINE Model FA5V



SPECIFICATIONS

Table: Working surface: width	ins.	16.7
length	ins.	78.6
Number of T-slots	ins.	0.78 x 3.54
Width x distance of T-slots	ins.	55
Longitudinal travel: by hand	ins.	17.7
by power	ins.	17.3
Cross travel: by hand	ins.	18.1
by power	ins.	17.7
Vertical movement: by hand	ins.	70
by power	ins.	50
Spindle: Standard taper hole	No.	5
On demand metric	ins.	22/20.4
Morse	ins.	0
Distance from spindle nose to top of table: maximum ISA/metr.	ins.	17.7
minimum ISA/metr.	ins.	45°
Distance from centerline of spindle to column	ins.	3.94
Head swivels in both directions	ins.	20
Vertical adjustment of spindle	ins.	18-1400
Spindle speeds: number	R. p. M.	15
standard series	ins./min	13/32-49
Feeds: Number	ins./min	0.1-12.4
Range of longitudinal and cross feeds	ins./min	126
Range of vertical feeds	ins./min	31.5
Power rapid traverses: Longitudinal and cross	ins./min	1440
Vertical	R. p. M.	15
Drive: Main motor: Speed	HP	20.5
Input	HP	1410
On demand: Input	R. p. M.	3.25
Feed motor: Speed	ins.	99 x 100
Input	ins.	10,400
Shipping data: Floor space required	lbs.	11,300
Weight of machine: with standard equipment	lbs.	12,000
with railway packing	lbs.	550
with seaworthy packing	cu. ft.	

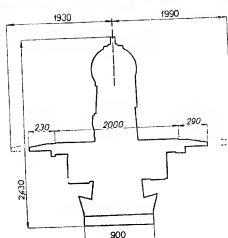
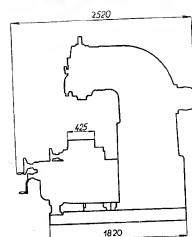
Contents boxed: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operating instructions.

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operating instructions.

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IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

KOVO PRAHA • CZECHOSLOVAKIA



PLAIN MILLING MACHINE Model FA5H



SPECIFICATIONS

Table: Working surface: width	mm	425
length	mm	2000
Number of T-Slots		3
Width x distance of T-Slots	mm	20 x 90
Longitudinal travel: by hand	mm	1410
by power	mm	1400
Cross travel ¹⁾ : by hand	mm	450
by power	mm	440
Vertical movement: by hand	mm	460
by power	mm	450
Spindle: Standard taper hole	ISA	70
On demand metric	No.	50
Morse	No.	5
Distance from centerline of spindle to top of table: maximum	mm	525
minimum	mm	65
Distance from spindle nose to inside of arbor support	mm	820
Distance from centerline of arbor to underside of overarm	mm	180
Distance from column to brace	mm	930
Spindle speeds: number		20
standard series	r. p. m.	18-1400
Feeds: Number		15
Range of longitudinal and cross feeds	mm/min	10-1250
Range of vertical feeds	mm/min	2.5-315
Power rapid traverse: Longitudinal and cross	mm/min	3200
Vertical	mm/min	800
Drive: Main motor: Speed	r. p. m.	1440
Input	HP	15
On demand: Input	HP	20.5
Feed motor: Speed	r. p. m.	1410
Input	HP	3.25
Shipping data: Floor space required	mm	3920 x 2550
Weight of machine: with standard equipment	kg	4500
with railway packing	kg	5000
with seaworthy packing	kg	5300
Contents boxed	m ³	12.5

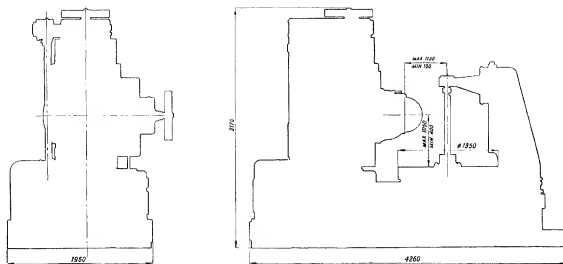
¹⁾ With arm brace 320 mm by hand and 310 mm by power.

STANDARD EQUIPMENT: Milling arbor with clamping bolt, cooling attachment, electrical equipment, 2 grease guns, set of wrenches, operating instructions.

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STROJEXPORT PRAHA-CZECHOSLOVAKIA



Specification

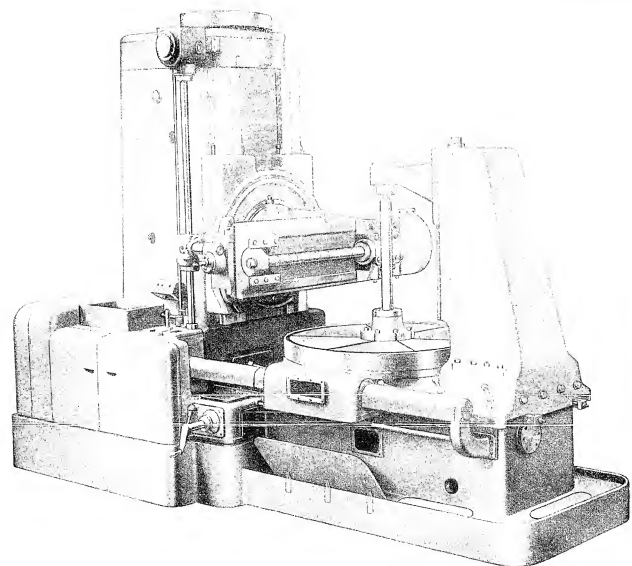
	Metric	English
Maximum modul of gear: with max. chip removal . . .	16	16
with machine norm. loaded . . .	20	20
Max. diameter of the hobbed gear: with max. chip removal mm	1600	63"
Max. dia. without stanchion with machine normally loaded mm	2000	78.5"
Face capacity of gears:		
gears over 1350 mm in dia. with straight teeth . . . mm	560	22"
gears under 1350 mm in dia. with straight teeth . . . mm	500	19.7"
Maximum distance, hob spindle to working surface of table mm	1050	41.4"
Minimum distance, hob spindle to working surface of table mm	400	15.7"
Maximum distance, center line of hob spindle to center line of work arbor . . . mm	1150	45.2"
Minimum distance, center line of hob spindle to center line of work arbor . . . mm	100	3.9"
Diameter of work table . . . mm	1350	53"
Bore of work table . . . mm	180	7.1"
Number of T-slots . . .	8	8
Diameters of hob arbors . . . mm	32-40-50-60	
Hob spindle speeds: Number (by change gears only) . . .	8	8
In range R 10, $\psi = 1.26$, ranging from r. p. m.	16-80	16-80
Output of main drive motor . . . HP	15	15
Output of rapid traverse motor . . . HP	7.5	7.5
Number of vertical feeds of hob slide . . .	36	36
Vertical feeds per 1 table revolution, ranging from . . . mm	0.25-6	0.01"-0.23"
Number of longitudinal feeds of work table . . .	36	36
Longitudinal feeds per 1 table revolution, ranging from . . . mm	0.05-1.5	0.002"-0.006"
Number of tangential feeds of hob slide . . .	36	36
Tangential feeds per 1 table revolution, ranging from . . . mm	0.1-3	0.004"-0.12"
Floor space required . . . mm	4300x2000	170"x79"
Weight of machine with standard equipment . . . kg	18100	lbs 40,000

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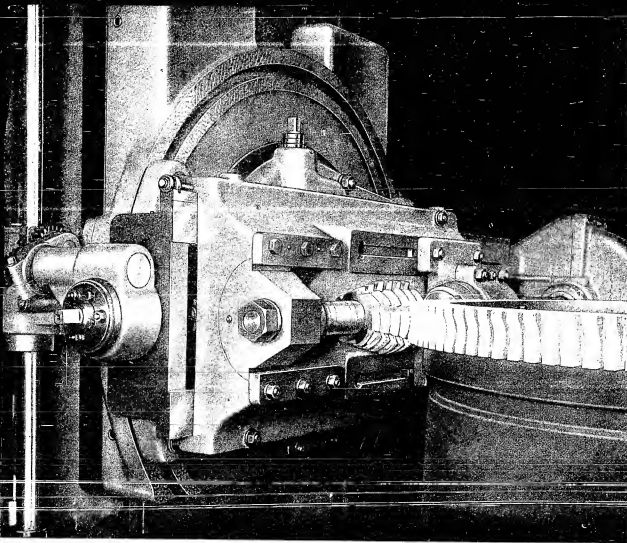
PRAHA — CZECHOSLOVAKIA



GEAR HOBGING MACHINE MODEL OF 16

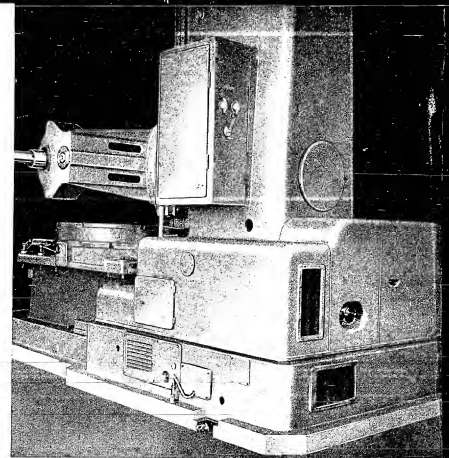
The machine is designed for the intensive production of precision spur, helical and worm gears by the conventional hobbing method, as well as for the cutting of external and internal spur and helical gears by the single indexing process. On the machine worm gears may also be cut by the tangential method, by using a worm hob, or one or several cutters. The wide speed and feed range enables the cutting of all commonly used kinds of material.





STANDARD EQUIPMENT: 2 electric motors to suit 380 or 200 volts including electrical equipment, cooling system with electric pump, 4 hob arbors dia. 32, 40, 50 and 60 mm, 1 work arbor with differential nut and plate, hob setting gauge, set of index change gears, set of differential change gears, set of feed change gears, set of speed change gears, service spanners, operator's instruction booklet, operating plates and tables.

Rear view of machine



OPTIONAL EQUIPMENT: Attachment for cutting worm gears by the tangential method, attachment for cutting spur and helical gears by the individual indexing method, cutter head for cutting external gearing, cutter head for cutting internal gearing with an end mill, 8 standard work supports for hobbing gears up to dia. 1200 mm, 8 standard work supports for hobbing gears from dia. 1200 mm upwards, work arbor support with bearing for cutting pinions and small diameter gears.

Description

THE DRIVE is by belts from the main motor through the gear box to the hob spindle driving mechanism, whence the power is transmitted to the worm gears for setting the number of teeth of the gear to be cut and to the hob slide feeding mechanism, as well as to the worm gearing for the work table feed. For cutting helical gears a differential gearing with change gears is provided, which are set on hand of the instruction booklet to suit the desired helix angle. Starting and stopping of the machine is accomplished from the operator's position by push buttons and remote controlled contactors.

THE HOB SLIDE with the accurately mounted hob spindle is swivelled by power and vertically adjusted on the ground flat guides of the stanchion. The hob slide and work table feeds are automatically disengaged by adjustable stops. The hob slide and the work table are moved by rapid traverse. To ensure correct alignment between the hob and the work table the machine is fitted with a hob setting gauge which is supplied as standard equipment.

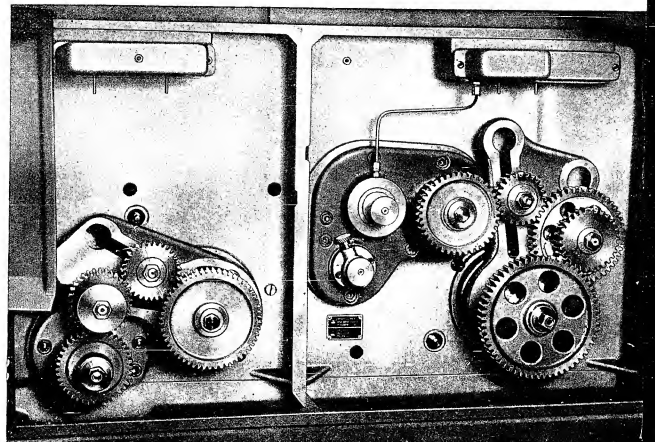
THE WORK TABLE is mounted on a shouldered, conical, vertical shaft which is provided on its lower end with a cylindrical centering pin. It is driven by a precision gearing with a hardened and ground worm for eliminating backlash and obtaining a correct, full tooth contact. While cutting the table is hydraulically relieved by the bearing of the cylindrical centering pin. The position of the work table and hob slide is easily checked on scales with vernier.

THE STANCHION with flat and ground guideways is firmly attached to the bed unit and its rigid construction ensures a quiet and accurate operation even at peak output.

LUBRICATION. The oil is delivered to all important points by an automatic lubricating system.

COOLING. A motor-driven electric pump supplies the coolant from a tank located inside the bed.

Gears for setting the number of teeth and for adjusting the helix angle

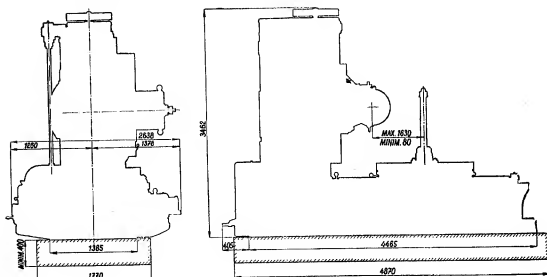


S P E C I F I C A T I O N

Maximum module of gear: with max. chip removal	mm	22	22
with machine norm. loaded	mm	30 25 18	30 25 18
Maximum diameter of gear: with max. chip removal	mm	2000	78.5"
with machine norm. loaded	mm	2000 2500 3000	78.6" 98.5" 118"
Face capacity of gears: gears over 1500 mm in dia. with straight teeth	mm	800	31.4"
gears below 1500 mm in dia. with straight teeth	mm	750	29.5"
Maximum distance, hob spindle to working surface of table	mm	1520	52"
Minimum distance, hob spindle to working surface of table	mm	400	15.7"
Maximum distance, center line of hob spindle to center line of work arbor	mm	1630	64.1"
Minimum distance, center line of hob spindle to center line of work arbor	mm	80	3.14"
Diameter of work table	mm	1500	59"
Bore of work table	mm	200	7.88"
Number of T-slots in work table		8	8
Diameters of hob arbors	mm	10 50 60 80	10 50 60 80
Hob spindle speeds: Number (by change gears only)	r. p. m.	12.5—63	12.5—63
In range R 10, $\phi = 1.26$, ranging from	HP	20	20
Output of main drive motor	HP	10	10
Output of rapid traverse motor	HP	36	36
Number of vertical feeds of hob slide	mm	0.2—6.00	0.0079"—2.36"
Vertical feeds per 1 table revolution, ranging from	mm	0.05—1.30	0.002"—0.059"
Number of longitudinal feeds of work table	mm	0.10—3.00	0.004"—0.118"
Longitudinal feeds per 1 table revolution ranging from	mm/min	6.45	0.254" per min.
Tangential feeds of hob slide	mm	1870 x 2640	192" x 104"
Tangential feeds per 1 table revolution, ranging from	mm	21000	46,000 lbs
Feeds for cutting by individual indexing method with standard hob slide and side milling cutter, ranging from	mm/min	4.15	0.161"
Feeds for cutting by individual indexing method with cutter head and end mill, ranging from	mm/min	6.45	0.254" per min.
Floor space required	mm	1870 x 2640	192" x 104"
Weight of machine with standard equipment	kg	21000	46,000 lbs

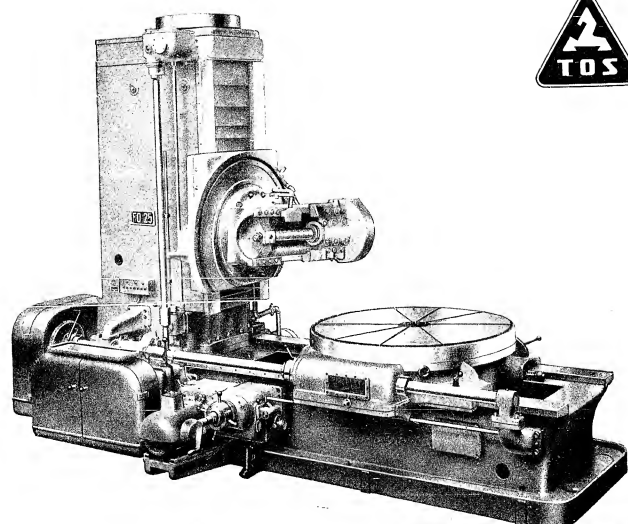
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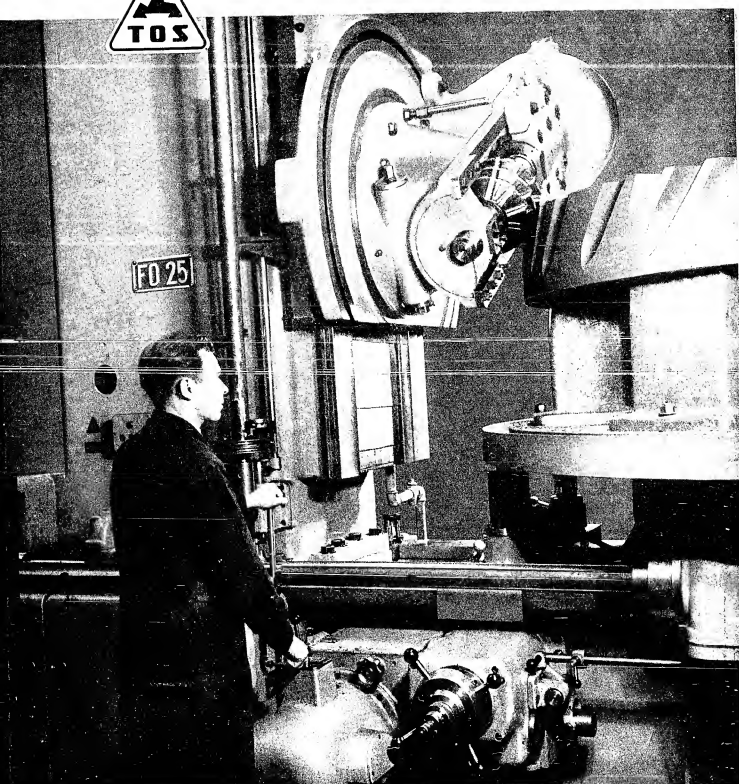


GEAR HOBGING MACHINE Model





FO 25



This Heavy Duty Gear Hobbing Machine is intended for the intensive production of precision spur, helical and worm gears by the conventional hobbing method. Worm wheels can also be cut by the tangential method. The wide speed and feed range enables the cutting of all commonly used kinds of material.

THE DRIVE is by belts from the main drive motor through the gearbox to the hob spindle mechanism and to the index worm gears for setting the number of teeth of the gear to be cut, whence the power is transmitted to the hob slide feeding mechanism and to the work table. For cutting helical gears a differential gearing with change gears for setting the helix angle is interposed in the driving mechanism. The tables for setting these change gears are to be found in the operator's instruction booklet. The machine is started and stopped from the operating position by pushbuttons for the remote control of the protective contactors.

THE HOB SLIDE with the accurately mounted hob-spindle may be swivelled and vertically adjusted on the prismatic and ground guideways of the stanchion. The hob slide and the work table feeds are automatically disengaged by adjustable stops. Power rapid traverse is provided for rapidly moving the hob slide and the work table to the required position. To ensure correct alignment between the hob and the work table the machine is fitted with a hob setting gauge which is supplied as standard equipment.

THE WORK TABLE is driven by a new, special worm and gear, designated „Dual Lead Worm Gearing“ permitting to eliminate backlash and to obtain a correct, full tooth contact. The table can be relieved by a hydraulic equipment with adjustable pressure to suit the weight of the gear being hobbled. The position of the work table and hob slide is easily checked on scales with vernier.

THE STANCHION with flat and ground guideways is fixedly attached to the bed unit and its rigid construction ensures a quiet and accurate cutting operation even at peak output.

LUBRICATION. The oil is delivered to all important points by an automatic lubrication system.

COOLING. A motor-driven electric pump supplies the coolant from a tank located inside the bed.

STANDARD EQUIPMENT:

2 electric motors to suit 380 or 220 volts including electrical equipment, cooling system with electric pump, 2 electric motors with electric motor for relieving the work table, 4 hob arbors dia. 40, 50, 60 and 80 mm, 1 work arbor with differential nut and plate, hob setting gauge, set of index change gears, set of differential change gears, set of speed change gears, set of feed change gears, set of service spanners, operator's instruction booklet, operating plates and tables.

OPTIONAL EQUIPMENT:

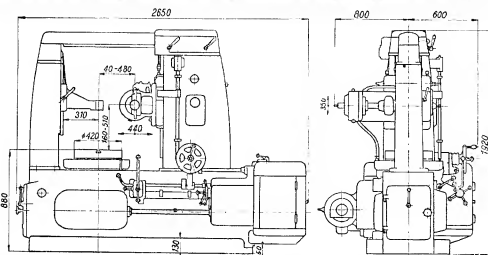
Attachment for cutting worm gears by the tangential method, attachment for cutting by the individual indexing method, cutter head for end mill, cutter head for cutting internal gearing by means of an end mill, 8 standard work supports for table dia. 1500 mm, standard work support with pulleys for table dia. 1500 mm, auxiliary work table dia. 2450 mm with work support, 8 work support for the auxiliary table dia. 2450 mm, work arbor support with bearing for cutting pinions and small diameter gears.

FO 25

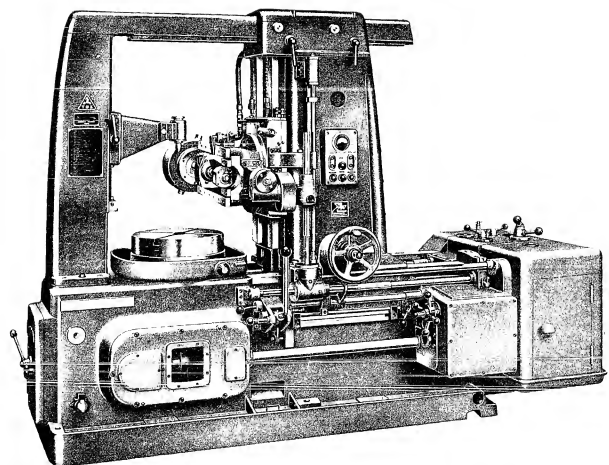
S P E C I F I C A T I O N :

Maximum module of gear	mm	6	6
Maximum diameter of gear	mm	800	31 1/2"
Maximum diameter of gear (with support)	mm	600	23 1/2"
Face capacity of spur gears: for gears dia. 820 mm	mm	280	11"
Face capacity and diameter of helical gears: for gears dia. 75 mm	mm	200	7 7/8"
Helix angle approx. 15°: face of gear	mm	250	9 7/8"
Helix angle approx. 30°: face of gear	mm	820	32 1/4"
Helix angle approx. 45°: face of gear	mm	210	8 1/4"
Helix angle approx. 60°: face of gear	mm	800	31 1/2"
Centre-line distance, table to work spindle: Maximum	mm	190	7 1/2"
Minimum	mm	80	3 1/8"
Minimum distance, centre line of work spindle to working surface of table	mm	600	23 1/2"
Vertical travel of hob slide	mm	180	7 1/8"
Maximum diameter of hob	mm	350	13 3/4"
Maximum length of hob	mm	120	4 7/8"
Diameter of work table	mm	136	5 3/8"
Bore of work table	mm	420	16 1/2"
Depth of work-table bore	mm	75	2.95"
Diameter of index worm gear	mm	350	13 3/4"
Diameter of hob arbours	mm	450	17 3/4"
Work spindle speeds: Number		22, 27, 32	12
Range	R. p. M.	15-190	15-190
Feeds: Number		9	9
Range of vertical hob-slide feeds per 1 table revolution	mm	0.33/5.2	4.9-77 cuts per inch
Range of longitudinal hob-slide feeds per 1 table revolution	mm	0.1-1.5	17-254 cuts per inch
Main drive motor: Speed	R. p. M.	1500/3000	1500/3000
Output	HP	4/3	4/3
Power rapid traverse motor: Speed	R. p. M.	1500	1500
Output	HP	1	1
Floor space required	mm	2540 x 1400	100" x 55"
Weight of machine:	kg	4000	lbs. 8800
With standard equipment	kg	4250	lbs. 9400
crated	kg	4750	lbs. 10500
boxed for export	kg	10	cu. ft. 0.55
Contents boxed	m³		
Attachment for cutting worm gears by the tangential method:			
Vertical travel of work spindle	mm	210	8 1/4"
Maximum diameter of worm gear at maximum module = 6 mm	mm	350	14 1/8"
Feeds: Number		9	9
Feed range per 1 table revolution	mm	0.15-2.45	10-170 cuts per inch
Weight of tangential attachment	kg	40	lbs. 88

The machine has been designed and built for generating gears up to the module 6, but its capacity permits to cut gears up to the module 8 under the same cutting conditions as for the module 6.

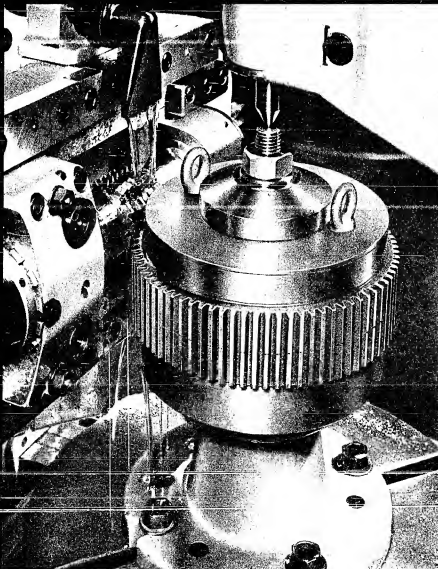


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GEAR HOBGING MACHINE Model F0 6

This is a Heavy Duty Machine for the intensive production of precision spur, helical and worm gears by the conventional hobbing method. Worm wheels can also be cut by the tangential method. The wide speed and feed range permits to cut all commonly used kinds of material.



GEAR HOB BING MACHINE FO 6

THE DRIVE is from the main drive motor through the gear box to the workspindle driving mechanism and to the index worm gearing for setting the number of teeth of the gear to be cut, whence the power is transmitted to the hob-slide feeding mechanism and to the work table. For cutting helical gears a differential gearing with change gears for setting the helix angle is interposed in the driving mechanism.

The machine is started and stopped from the operating position by push-buttons provided for the remote control of the protective contactors.

THE HOB SLIDE

with the accurately mounted work spindle is swivelled and vertically adjusted on the flat guideways of the stanchion. It is carefully balanced by a counterweight. The hob-slide and stanchion feeds are automatically disengaged by adjustable stops. Power rapid traverse is provided for moving the hob slide rapidly in either direction. To secure a correct alignment between the hob and the work table the machine is fitted with a hob setting gauge which is supplied as standard equipment.

THE WORK TABLE

is driven by a new, special worm and gear, designated „Dual Lead Worm Gearing“ permitting to eliminate backlash and to obtain a correct, full tooth contact. The table mounting is also adjustable.

STANCHION

The stanchion with the hob slide is mounted on the bed and may be rapidly moved in any predetermined position. It is connected with the work support by an overrun, thus forming together with the bed unit a compact frame to ensure rigidity and quiet and accurate cutting operation even at peak output. The motion of the stanchion and hob slide is easily read on a scale with vernier.

LUBRICATION

The oil is delivered to all important points automatically.

COOLING

A motor driven electric pump supplies the coolant from a tank inside the bed.

STANDARD EQUIPMENT

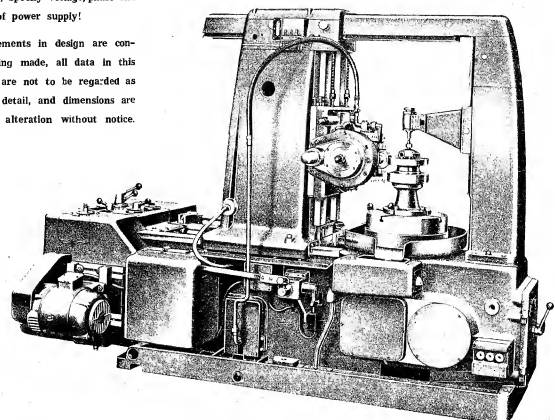
2 electric motors for 300 or 220 volts, including electrical equipment, cooling attachment with electric pump, 3 hob arbours dia. 22, 27 and 32 mm, 1 work arbour with differential nut and plate, hob setting gauge, work arbour support with bearing, 1 set of index change gears, 1 set of differential change gears, 1 set of service spanners, operating plates and tables, operating instructions.

OPTIONAL EQUIPMENT

attachment for cutting worm gears with the tangential method, auxiliary table dia. 670 mm, 6 cast iron plates for clamping the gears on the auxiliary table dia. 670 mm, auxiliary table dia. 650 mm, 6 cast iron plates for clamping the gears on the auxiliary table dia. 650 mm.

In ordering, specify voltage, phase and frequency of power supply!

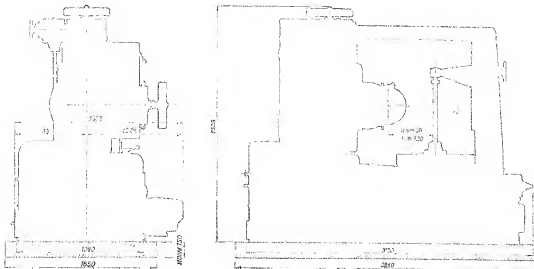
As improvements in design are continually being made, all data in this prospectus are not to be regarded as binding in detail, and dimensions are subject to alteration without notice.



SPECIFICATION:

Maximum module of gear: with max. stock removal	10	10
with machine norm. loaded	12	12
Maximum diameter of gear without stanchion:		
with max. stock removal	mm 1000	39.3"
with machine norm. loaded	mm 1250	49.2"
Maximum diameter of gear (with stanchion)	mm 750	29.5"
Face capacity of gears: gears over 650 mm in dia. with straight teeth	mm 400	15.7"
gears up to 650 mm in dia. with straight teeth	mm 350	13.8"
Maximum distance, hob spindle to working surface of table	mm 710	27.9"
Minimum distance, hob spindle to working surface of table	mm 280	11"
Maximum distance, center line of hob spindle to center line of work arbor	mm 720	28.3"
Minimum distance, center line of hob spindle to center line of work arbor	mm 50	1.96"
Diameter of work table	mm 850	33.4"
Bore of work spindle	mm 100	3.93"
Number of T — slots in work table		8
Diameters of hob arbors	mm 32—40	32—40
Hob spindle speeds: Number		9
In range R 10 ϕ — 1.26, ranging from	r. p. m. 20—125	20—125
Output of main drive motor	HP 10	10
Output of rapid traverse motor	HP 4	4
Number of vertical feeds of hob slide	mm 36	36
Vertical feeds per 1 table revolution, ranging from	mm 0.2—6.00	0.0079"—2.36"
Number of longitudinal feeds of work table	mm 36	36
Longitudinal feeds per 1 table revolution, ranging from	mm 0.05—1.50	0.002"—0.059"
Number of tangential feeds of hob slide	mm 36	36
Tangential feeds per 1 table revolution, ranging from	mm 0.133—4.00	0.0052"—0.157"
Feeds when cutting by the individual indexing method with standard hob slide and side milling cutter	mm/min. 2.5	0.09" p. m.
Floor space required	mm 3120—1640	126" x 72.3"
Weight of machine with standard equipment	kg 9000	19800 lb

As improvements in design are continually being made, the above specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

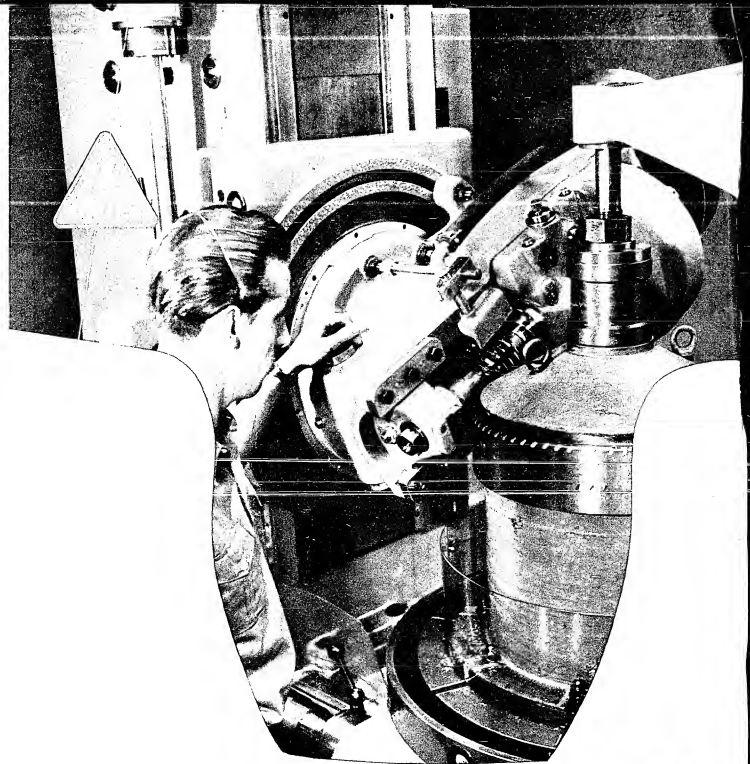


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COK 52603 a - 5501

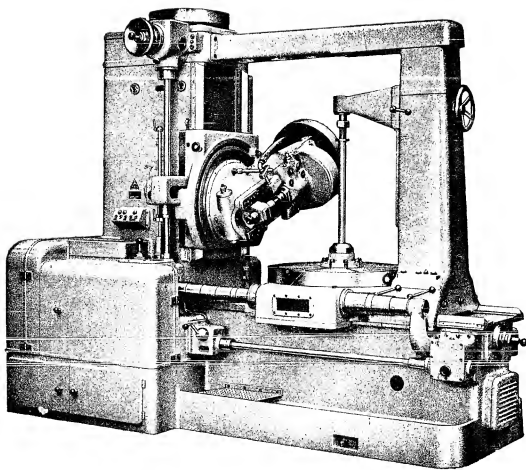
Printed in Czechoslovakia



GEAR HOBGING MACHINE

Model

GF 10



GEAR HOBBIING MACHINE

Model

This Heavy Duty Gear Hobbing Machine is intended for the intensive production of precision spur, helical and worm gears by the conventional hobbing method. Worm wheels can also be cut by the tangential method. The wide speed and feed range enables the cutting of all commonly used kinds of material.

THE DRIVE

is by belts from the main drive motor through the gearbox to the hob spindle mechanism and to the index worm gearing for setting the number of teeth of the gear to be cut, whence the power is transmitted to the hob slide feeding mechanism and to the work table. For cutting helical gears a differential gearing with change gears for setting the helix angle is interposed in the driving mechanism. The tables for setting these change gears are to be found in the operator's instruction booklet. The machine is started and stopped from the operating position by pushbuttons for the remote control of the protective contactors.

THE HOB SLIDE

with the accurately mounted hob-spindle may be swivelled and vertically adjusted on the pneumatic and ground guide-ways of the stanchion. The hob slide and the work table feeds are automatically disengaged by adjustable stops. Power rapid traverse is provided for rapidly moving the hob slide and the work table to the required position. To ensure correct alignment between the hob and the work table the machine is fitted with a hob setting gauge which is supplied as standard equipment.

THE WORK TABLE

is driven by a new, special worm and gear, designated „Dual Lead Worm Gearing“ permitting to eliminate backlash and to obtain a correct, full tooth contact.

THE STANCHION

with the hob slide, and the work arbor support are connected by the overarm, thus forming together with the bed unit a compact frame for increasing the rigidity and ensuring a quiet and accurate cutting operation even at peak output. The position of the work table and hob slide is easily checked on scales with vernier.

LUBRICATION

The oil is delivered to all important points by an automatic lubrication system.

COOLING

A motor-driven electric pump supplies the coolant from a tank inside the bed.

STANDARD EQUIPMENT

2 electric motors for 360 or 220 volts including electrical equipment, cooling system with electric pump, 2 hob arbors dia 32 and 40 mm, 1 work arbor with differential nut and plate, hob setting gauge, work arbor support with bearing, set of index change gears, set of differential change gears, set of speed change gears, set of feed change gears, set of service spanners, operator's instruction booklet, operating plates and tables.

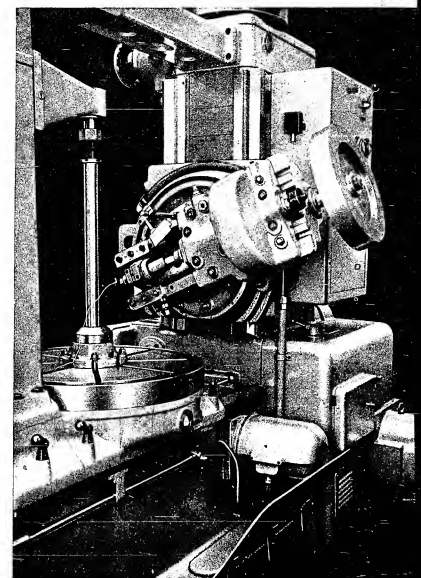
OPTIONAL EQUIPMENT

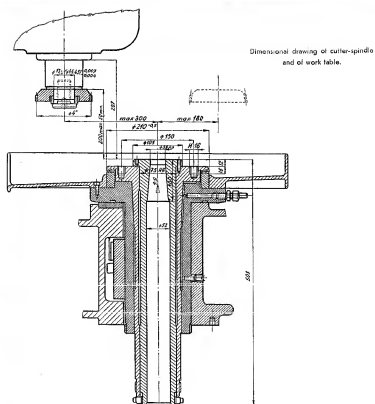
Attachment for cutting worm gears by the tangential method, attachment for cutting by the individual indexing method by means of a side milling cutter, two sets of cast iron work supports for gears of various diameters, one set consisting of 8 work supports.

In ordering, specify voltage

phase and frequency

of power supply!





Dimensional drawing of cutter-spindle and of work table.



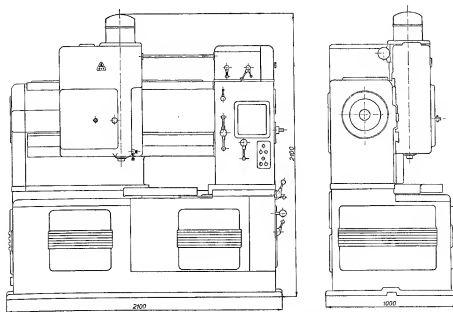
SPECIFICATIONS:

Maximum module	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Maximum diameter of spur gear	mm	500
Maximum diameter of helical gear	mm	500
Maximum diameter of gear	mm	500
Maximum width of gear	mm	100
Distance from end of addendum to table surface	mm	200
Strokes of cutter	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Number of strokes per minute	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Feed of cutter	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Number of strokes per cutter revolution	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Dimensions of cutter	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Distance of base	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Rate of table	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Electric motor	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Speed	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Flare space required	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Height of machine	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Weight of machine	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Weight of machine with standard equipment	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Weight of machine with optional equipment	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000
Weight of machine with standard and optional equipment	mm	10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200, 4000, 5000, 6300, 8000, 10000

All improvements in design are continually being made; this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

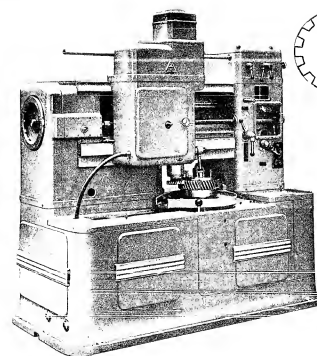
IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.

STROJEXPORT PRAHA - CZECHOSLOVAKIA



COX 1000 1-1012

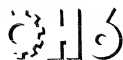
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HIGH SPEED GEAR SHAPER

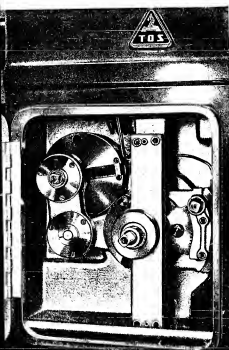
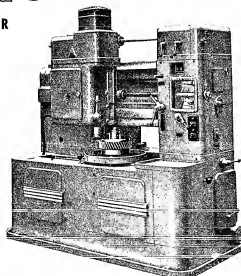
This machine is used for the production of gears on the molding-generating principle and is particularly adapted to the cutting of precision internal and external spur, helical, and herring-bone gears. It can also be employed for cutting segment gears, gear tooth type clutches, ratchets, cams, equine, hexagonal and other shaped holes, etc., and by using special attachments also for generating necks. High accuracy, wide scope of application, ease of set-up and operation are the outstanding features of the machine. By the possibility of selecting the number of cutter strokes and thus the high-reciprocating wide range cutter speeds an economical production of gears of various kinds of materials is enabled. Also the selection of convenient feeds into the cut greatly contributes to a higher output of the machines.





HIGH SPEED GEAR SHAPER

The machine works on the principle of two gears rolling together. The cutter having the shape of the gear to be formed is moved on a straight line up and down by a crank arm mechanism. On its downward stroke the cutter removes chips from the gear blank which is clamped on the rotary table. On its return stroke the cutter is withdrawn from the gear blank so as not to damage the machined surface. During the operation the cutter reciprocates with the gear blank, generates teeth or the required shape on the workpiece, and is simultaneously fed to the cut up the depth of cut.

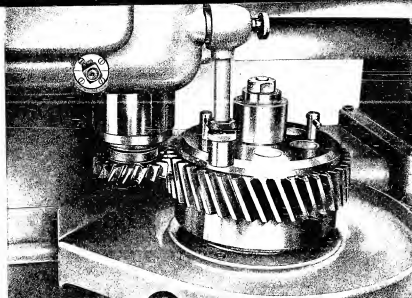


GENERAL DESCRIPTION

THE SADDLE travels on the prismatic bed-ways. The cutter-spindle is mounted in two precision bearings and is moved into the cut by two interchangeable guides. The lower bearing may be adjusted by means of a sleeve to reduce the overlap of the cutter. The saddle is fed into the cut by a depth feed cam for producing 1, 2 or 3 cuts according to the required accuracy and surface finish. The saddle is of the box-type to eliminate vibrations resulting from the chip removal, and thus to ensure quiet running of the ram.

During the entire operating cycle the machine works automatically and after its completion the saddle is withdrawn from the gear-workpiece. The withdrawal of the saddle from the cut is actuated by an oil damper.

Crank arm mechanism of the ram

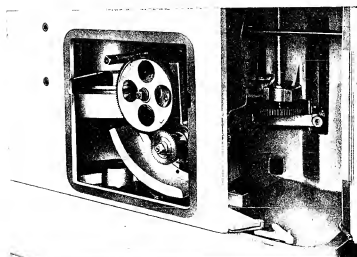


THE WORK TABLE is rotated by a precision worm wheel through index change gears the power being transmitted from the main drive shaft. It is provided on a tapered bracket which at the return stroke of the cutter removes the completed workpiece to prevent the cutter edges from dulling. For the loading of large workpieces the table may be swung aside. The clamping arbors are carried in a slide and may be easily retracted. Chips are collected in a large chip pan where they are drawn by the ram into the waste well.

THE DRIVE is by V-belts from an electric motor through the gearbox which serves for driving the crank-arm mechanism of the cutter-spindle, the feed box and the rotary table. The push buttons for starting the motor and all controls are centralized at the operating position. After the completion of the operating cycle the motor is cut out by a limit switch.

THE BEE with the saddle sideways is of the box-type and has two lateral columns. In the left-hand part of the bed is incorporated the gearbox and at the right the feed mechanism. The bed is designed to give the machine additional stiffness and thus to ensure accurate work. The V-ways absorb all pressures set up during operation. All rotating and movable parts of the machine are covered to protect the operator from injury.

THE MACHINE CABINET is adequately ribbed to eliminate the pressure exerted on the table, and contains the motor, the electrical equipment and the tank for the cooling and lubricating oil. In the left-hand part of the cabinet the change gears are mounted and all openings are protected by easily detachable covers against the entrance of dust.



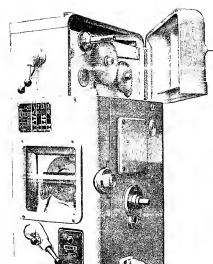
Index change gears

THE LUBRICATION of all movable parts is automatic. The oil is supplied by a gear pump to the top of the machine where it flows by gravity lead into the oil tank passing through all oiling points. The cutter-spindle is provided with oil wells from where the oil is distributed by wicks to all oiling points. The table is lubricated by an independent oil pump from the common oil tank.

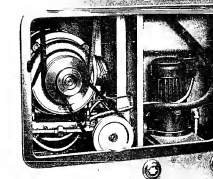
THE COOLANT from the coolant tank housed inside the machine cabinet is supplied to the work by an electric pump controlled by push buttons from the operating position.

STANDARD EQUIPMENT: 1 two-cut feed cam, set of index change gears, set of feed change gears, set of spacers, grease gun, auxiliary attachment for changing the cutter-spindle gears, electrical equipment (including motor to suit 180 or 220 volts, cooling attachment, tables, operating plates, operating instruction booklet).

OPTIONAL EQUIPMENT: 1 single-cut feed cam, 1 three-cut feed cam, guides for cutting helical gears, rack cutting attachment, index change gears not specified in the standard set, holder of dial indicator.



Feed change gears

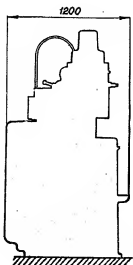
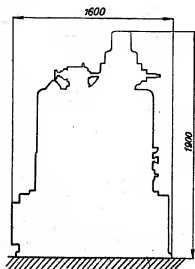


Main drive and electric pump



SPECIFICATIONS :

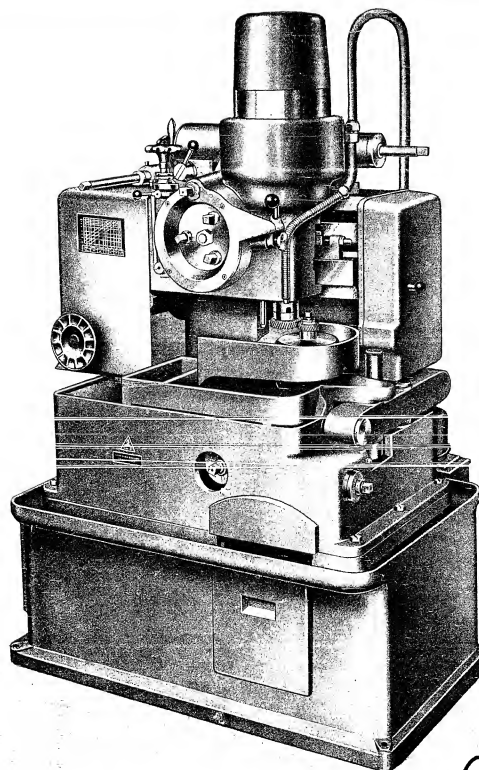
Maximum module	4	
	external gears	internal gears
Maximum diameter of spur gears	200 7 7/8"	165 6 1/2"
Maximum diameter of helical gears	195 7 3/4"	165 6 1/2"
Maximum diameter of gears	10 3/4"	30 1 1/4"
Maximum width of gears	40 1 1/2"	36 1 3/4"
Distance, nose of ram to working surface of table:		
minimum	60	2 3/4"
maximum	120	4 3/4"
Stroke of cutter:		
Number of stroke ranges	4	
Number of strokes per minute	220—320—445—635	
Feed of cutter:		
Number of feed ranges	8	
Number of strokes per cutter rev.	465 to 2360	
Dimensions of cutter:		
Standard diameter	3"	
Maximum diameter	4"	
Diameter of bore	1 1/4"	
Bore of table	38	1 1/2"
Electric motor:		
Output	HP	1.2/0.75
Speed	r.p.m.	1410/990
Floor space required	mm	930 X 1200
Overall height of machine:	mm	1700
Weight of machine:		
with standard equipment	kg	1500
with packing	kg	1550
with sawdust packing	kg	1650
Contents boxed	m ³	2.6
Box measurements (width X length X height)	cm	100 X 130 X 200



As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

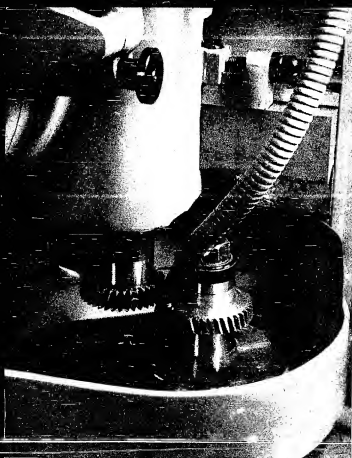
STROJEXPORT PRAHA - CZECHOSLOVAKIA



HIGH SPEED GEAR SHAPER Model

OH4

The numerous advantages of our gear-shapers such as short cutter travel combined with high-reciprocating cutter speeds, and ease of control and operation are the proof of a wide range of applications especially where the requirements for accuracy and economy of production are of prime importance.



HIGH SPEED GEAR SHAPER Model

The machine is used for the production of gears on the moulding-generating principle and is particularly adapted to the cutting of accurate internal and external spur, helical and herringbone gears. It can also be applied to the cutting of segment gears, gear tooth type clutches, ratchets, cams, square, hexagon and other shaped holes, etc. The machine is easy to operate and set up thus facilitating economical cutting of gears in the small lot as well as in the single part production.

DESCRIPTION OF THE MACHINE

THE SADDLE with accurately mounted ram is adjustable on the table guideways. It is fed into the cut by an interchangeable cam which enables to produce a gear in 1, 2 or 3 cuts at a single clamping, according to the required accuracy and quality of the surface finish. The ram is carefully balanced to ensure quiet and smooth operation without the noxious chatter. After the operating cycle is completed the tool is automatically withdrawn from the work.

The work table is driven by a precision worm wheel transmission through index change gears. It is mounted on a hinged bracket, and at the return stroke of the cutter the generated gear is removed to prevent the edge of the cutter from dulling. The clamping arbours centred in a taper are easily accessible.

The machine is fitted with a limit switch for stopping when the operating cycle is finished.

For generating internal gears the machine must be equipped with an operating-arm extension. The entire crank-arm mechanism is enclosed by a swinging door provided with a handwheel which is pulled out and turned for moving the ram thus bringing the cutter into its proper position corresponding to the generated gear, also when the door is shut. The crank-arm stroke for the ram drive and the length of crank-arm are adjustable to enable the generating wheel to be set to the most convenient position with regard to the generated gear.

MOTOR DRIVE

The machine is driven by V-belts through a 1-step pulley from a 2-speed electric motor located inside the base. Gears and change gears are provided for actuating the ram drive mechanism and for simultaneously achieving the rotary motion of cutter and work table. Starting and stopping of the machine from the operator's position is accomplished by push buttons which also serve for the remote control of the protective contactors. The operation proceeds automatically and after it is completed the electric motor is stopped by a limit switch.

THE BED

With the saddle slideways is mounted on the base containing the coolant tank. By the ingenious construction and design of bed and base rigidity and stability of the machine is increased and thus an exceptionally accurate work ensured. The electrical installation located inside the base is adequately protected from dust and oil.

THE SPEEDS

of the electric motor are changed by operating a lever.

The contactors and fuses placed inside the base are readily accessible.

LUBRICATION. The ram, worm and transmitting mechanism are automatically oiled. The other machine members are lubricated by grease gun.

THE COOLANT is supplied by an electric pump from the tank located in the base.

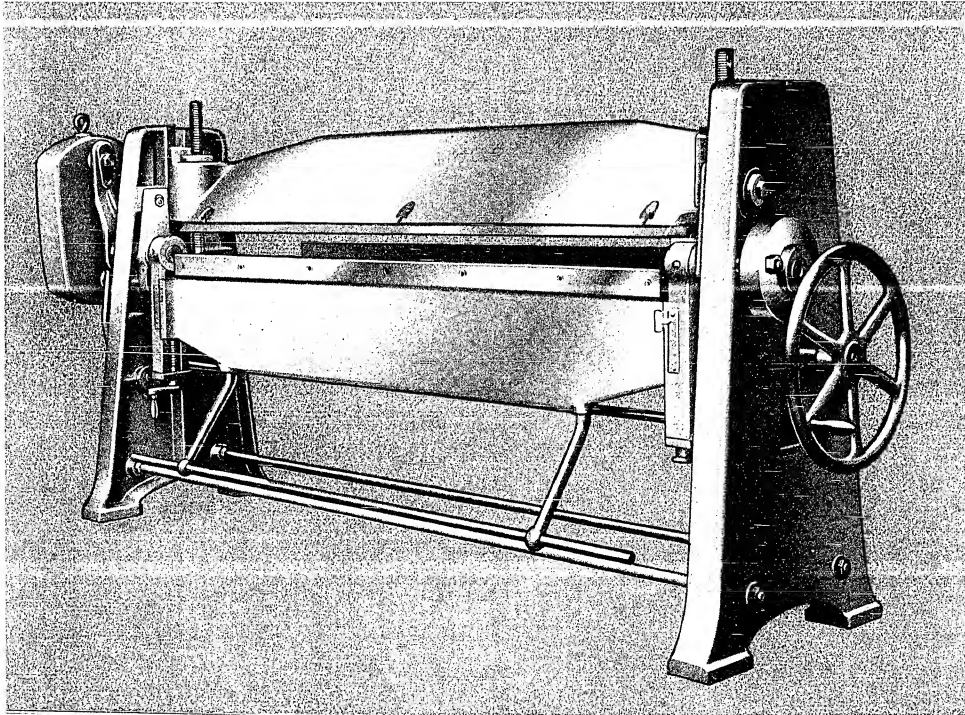
STANDARD EQUIPMENT:

Two cut feed cam, set of index change gears, set of feed change gears, set of spanners, grease gun, auxiliary attachment for changing the cam, electric motor 380 or 220 volts including electrical equipment, cooling attachment, operating plates, operator's instruction booklet.

OPTIONAL EQUIPMENT:

Attachment for cutting helical gears, single-cut feed cam, three-cut feed cam.





Model XK 200/2

UNIVERSAL BENDING, BULBING AND ROUNDING MACHINE

This machine is especially suited for the hand bending of iron and steel sheets in the manufacture of cars, aircraft, safes, steel furniture, car bodies, in tinsmith's workshops, etc.

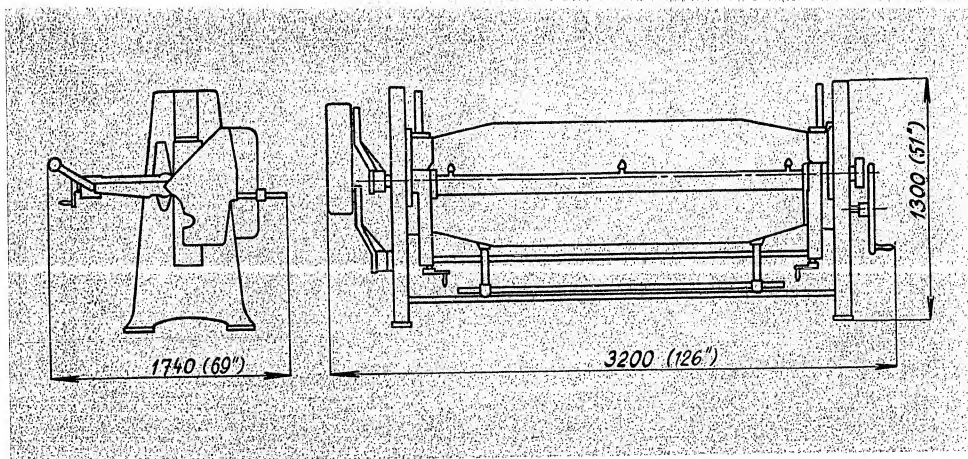
The sturdy construction of both columns and of the longitudinal box-type girders ensures a perfect performance of bends all over the working length. The upper bending cheek is elevated by a handwheel the elevating screws being mounted in ball bearings.

The lower bending cheek is horizontally adjusted by eccentric pins to the plate thickness and to the required radius of bend. The adjustment of the lower cheek to the radius of the pipe or trough to be bent is accomplished by hand cranks. The bending cheek is adequately balanced by a counterweight of new design which reduces the floor space of the machine. The machine is also adapted to the bending of pipes by means of a wooden roller. For making bulbs the slot for guiding the bulb iron is arranged directly in the table.

To obtain, in the mass production, all bulbs absolutely uniform the machine is fitted with an adjustable stop on its right-hand side.

The bending bars are inserted into the upper bending cheek and clamped by 3 bolts.

STROJEXPORT



Standard Equipment

- 1 bulbing attachment
- 1 bar for sharp bends
- 1 bar for half-round bends
- 1 wooden roller dia. 75 mm
- 1 wooden roller dia. 100 mm
- 1 bulb iron dia. 16 mm
- 1 set of spanners
- operating instruction booklet

Additional bars and bulb irons are supplied on special order at an extra charge.

SPECIFICATIONS:

		Metric	English
Working length	mm	2010	80"
Maximum plate thickness (40 kg/mm ² tensile)	mm	2	0.08"
Stroke of upper tending cheek	mm	90	3.5"
Adjustment of lower bending cheek	mm	90	3.5"
Maximum diameter bent	mm	180	7.1"
Weight of machine	kg	1950	4300 lbs
Weight of machine with packing	kg	2050	4500 lbs
Weight of machine with seaworthy packing	kg	2500	5080 lbs
Dimensions of case	cm	505 X 150 X 100	120" X 59" X 39"
Contents boxed	m ³	4.5	160 cu. ft.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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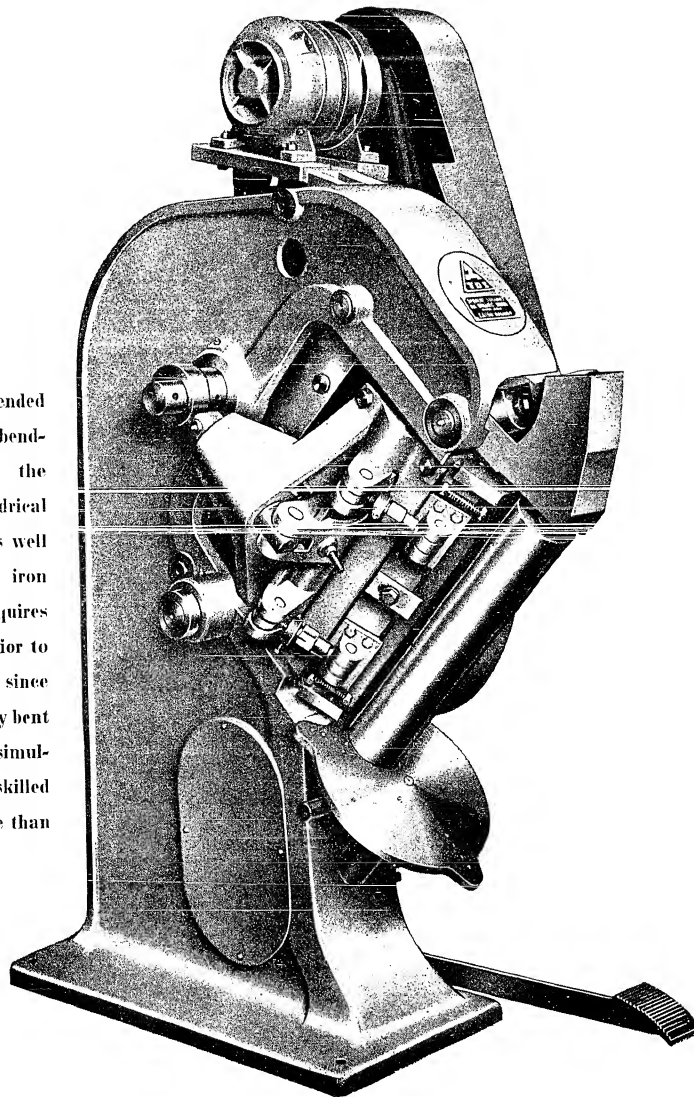
P R A H A * C Z E C H O S L O V A K I A

STROJEXPORT

FOLDING, BENDING AND GROOVING MACHINE XOS (DJS VI)

STAT

This machine is intended exclusively for folding, bending and grooving in the manufacture of cylindrical and square type tins as well as for joining sheet iron plates. The sheet iron requires no special treatment prior to the folding operation, since after being automatically bent and folded, the sheet is simultaneously grooved. A skilled operator produces more than 1000 seams per hour.



The machine consists of a rugged column the upper part of which embodies the driving mechanism for the upper bending and grooving bar. In the lower part of the column an inclined arbour and the lower bending and grooving bar with its mechanism are mounted. The angular position of the bars and of the arbour enables the operation to be easily inspected. The power is transmitted by V-belts from an individual electric motor.

STANDARD EQUIPMENT:

Electric motor with electrical equipment, set of V-belts, 1 bending bar either for internal or for external seams, set of spanners. Spare bending and grooving bars are supplied at an extra charge.

SPECIFICATION:

Max. length folded	mm	539	20-8"
Min. diameter of tin	mm	120	4-7"
Max. plate thickness	mm	0-7	0-027"
Electric motor: Output	HP	3	3 HP
Speed	r. p. m.	1400	
Floor space required: length	mm	650	25-5"
width	mm	1280	50"
height	mm	1750	69"
Weight of machine	kg	1500	3300 lbs

All above data, dimensions and illustrations are not binding.

STROJEXPORT

P R A H A - C Z E C H O S L O V A K I A

COK 520590 2-5506

Printed in Czechoslovakia

THREE - ROLL ROUNDING MACHINES

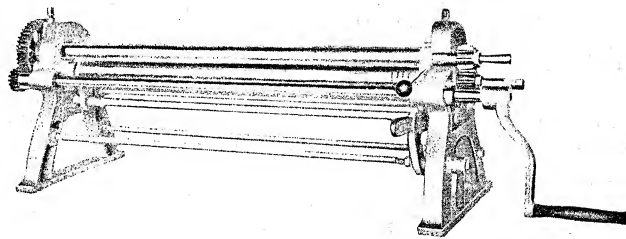
SINGLE - GEARED ROUNDING MACHINE MODEL

100/1

After the right bearing has been taken up the upper roll may be swung out to facilitate the removal of the rounded plate. The lower roll can be set by means of a handle parallel to the upper roll to suit the different plate thickness. The rear roll can also be adjusted by means of a handle with pawl so as to enable the rolling both of cylindrical and conical shapes. The lower and the rear rolls are provided with slots for insertion of wire. A slot along the whole length of the upper roll is provided for making narrow bends.

A base for these machines is supplied on special order.

For rolling thinner plates the crank can be set directly on the lower roll and the plate is rolled without transmission gears. The rolls are provided with square ends for quick displacement of the crank.



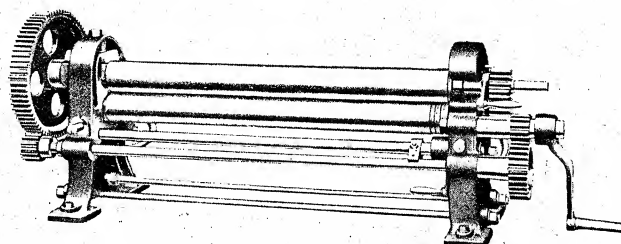
SPECIFICATIONS:

Maximum working length	mm	1020
Maximum plate thickness	mm	1
Diameter of rolls	mm	54
Weight of machine without base	kg	145
Weight of machine with packing	kg	165
Weight of machine with seaworthy packing	kg	190
Weight of machine with base	kg	195

SINGLE - GEARED ROUNDING MACHINE MODEL

100/2-3

Single-geared rigid design on low legs. By displacing the crank on the lower roll the rounding operation without transmission gears is enabled. The lower roll is lifted by means of toothed keys, the rear one by eccentrics, even while running. With the heavier type the rear roll is lifted by means of screws and wheels. Otherwise the machine is similar in design to the Model XZ 100/1.

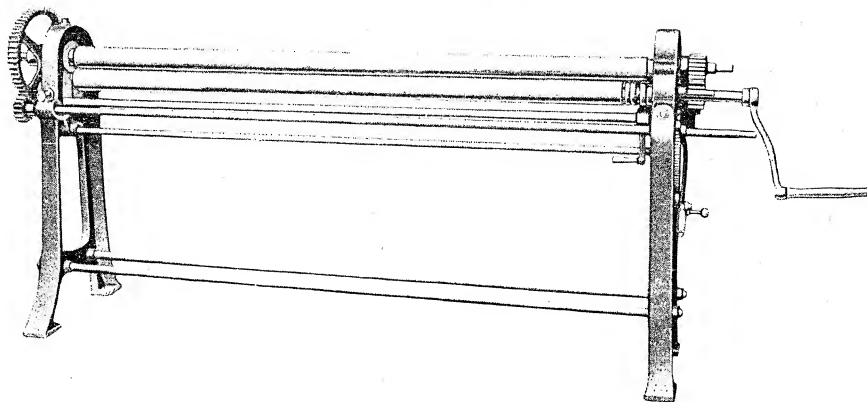


SPECIFICATIONS:

Model	XZ 100/2	XZ 100/3
Maximum working length	mm 1030	1030
Maximum plate thickness	mm 2	3
Diameter of rolls	mm 75	90
Weight of machine	kg 230	325
Weight of machine with packing	kg 260	365
Weight of machine with seaworthy packing	kg 290	405

SINGLE - GEARED ROUNDING MACHINE MODEL**200/1**

A standard type machine but with a larger working length. The lower roll is lifted towards the upper one by means of toothed keys. Both the lower and upper rolls are provided with slots for insertion of wire.

**SPECIFICATIONS:**

Maximum working length	mm 2050
Maximum plate thickness	mm 1
Diameter of rolls	mm 80
Weight of machine	kg 650
Weight of machine with packing	kg 710
Weight of machine with seaworthy packing	kg 800
Box measurement	mm

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

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STANDARD EQUIPMENT

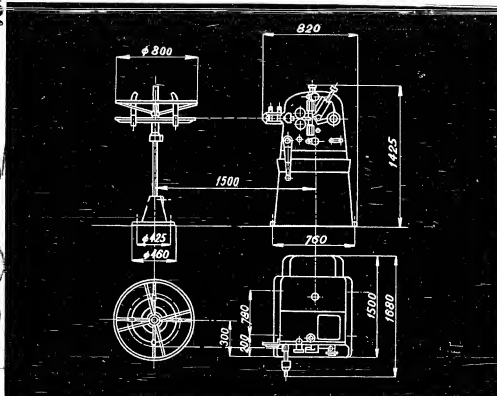
1 set of exchangeable feeding wheels, 1 set of wire guides, 1 set of forks, 3 cutting knives, 3 cutting mandrels, 3 pitch wedges, narrow, R. H., 3 pitch wedges, narrow, L. H., 3 pitch wedges, wide, R. H., 3 pitch wedges, wide, L. H., 1 set of pitch cams, 1 set of length cams, 3 cam blanks for springs of special shapes, 1 coiling assembly for R. H. springs, 1 coiling assembly for L. H. springs, 1 wire stand, spanners, oil can, spring counter, complete electrical equipment.

Ring manufacturing attachment - maximum output 180 rings per min. Coolant tank with pump and water connection.

SPECIFICATION

Minimum diameter of wire	0.8	21 S. W. G.
Maximum diameter of wire	3.5	10 S. W. G.
Minimum diameter of spring	50	1 7/8"
Maximum diameter of spring	5	1 1/4"
Minimum diameter of spring		
Maximum uncoiled length of spring with automatic cutting	11000	36 ft
Maximum rate of production of springs per minute	75	
Maximum rate of production of rings per minute	180	
Electric motor: speed	1400	
power	3	HP
Diameter of wire reel	800	31 1/2"
Carrying capacity of wire stand	100	220 lbs
Weight of machine with equipment	1050	2315 lbs
Shipping weight of machine	1200	2645 lbs
Dimensions of packing case	2700 x 900 x 1500	8'11" x 3' x 5'

DIMENSIONAL DRAWING



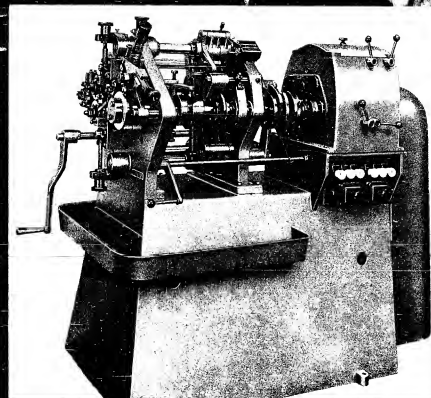
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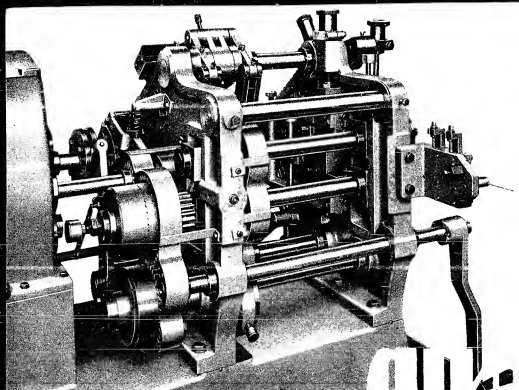
COK 32330 - 3301

Printed in Czechoslovakia



Universal Automatic Coil Spring Manufacturing Machine





Universal Automatic Coil Spring Manufacturing Machine Type

This machine is suitable for the manufacture of pressure coil springs, pressure coil springs with ends pressed plane, tension coil springs, pressure-tension coil springs, single and double bevel springs, springs of special shapes, bowden cables and rings.

Outstanding features:

- Quick setting
- Easy operation
- High output
- High precision



Once set the machine works fully automatically. The material to be used is carried on a stand with a revolving reel standing next to the machine. The machine draws the wire from the reel by itself, straightens it on a built-in straightening device and feeds it, by means of feeding rollers, into guide forks which give the spring its diameter and/or shape in accordance with the setting. The pitch of the spring is set by a pitch wedge. The cutting of the ends of finished springs is also done automatically by a cutting knife on a mandrel.

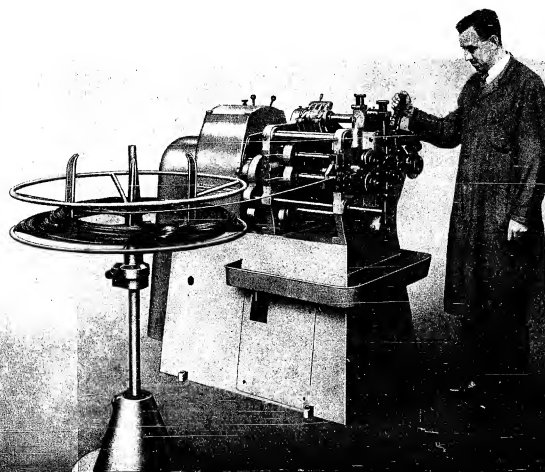
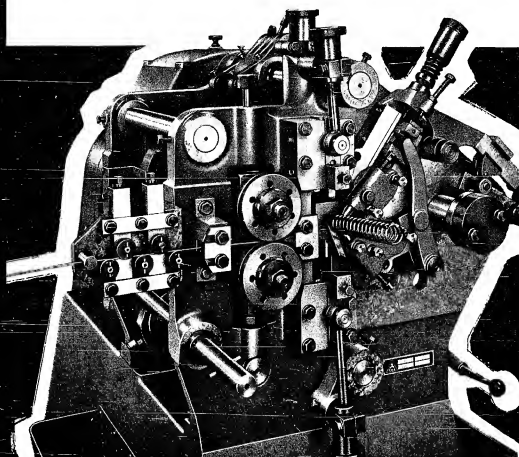
The number of springs manufactured may be followed on a built-in counter.

The setting of the machine is simple. It is made by changing the position of cams on a camshaft. The cams are designed universally and only for the manufacture of springs of special shapes (bevel and double bevel springs etc.) need a single cam with the required falls and rises be made of the blank supplied with the machine as standard equipment.

The gear box has 10 steps for setting the speed of the camshaft in accordance with the uncoiled length of the spring to be manufactured and 3 steps for setting the output, i. e. the number of springs to be manufactured per minute.

The speed may be set in the gear box to suit the thickness of wire being used and the diameter of the spring in its compressed state.

The machine is fitted with a coolant tank and pump.



SPECIFICATION



PRINCIPAL DATA AND DIMENSIONS:

Grinding capacity of the machine:		
peripheral and face cams up to a diameter of	approx. mm	800
cylindrical cams up to a diameter of	approx. mm	750
Maximum rise of machined lobe	approx. mm	300
Ratio of template spindle speeds to headstock spindle speeds		1 : 1
Maximum pitch angle of template		35°
Distance, centre-line of template spindle to centre-line of work spindle in horizontal position	mm	506
Diameter of template spindle head	mm	140
Height of centre-line of template spindle above floor	approx. mm	485
Range of diameters of templates being used	mm	150 to 750
Thickness of templates being used	mm	12 to 15
Diameter of copying roller, standard	mm	30
Maximum/minimum distance, end of wheel spindle to front clamping plate with workhead spindle in horizontal position	mm	530/0
Maximum/minimum distance, end of spindle to centre-line of workhead spindle in vertical position	mm	540/130
Width of bed-ways	mm	400
SLIDE AND WORKHEAD:		
Longitudinal travel of slide on bed	mm	530
Height of centre-line of workhead spindle above bed-ways	mm	413
Number of rates of rotary feed of workhead spindle		8
Range of rates of rotary feed workhead spindle:		
1 revolution of workhead takes	min.	3.4—2.3
Taper in both ends of workhead spindle	Morse No.	5
Bore of workhead spindle	mm	37.5
Diameter of clamping plates	mm	350
WHEEL SLIDE:		
Vertical travel of wheel slide on column	mm	600
Speed of wheel spindle in either direction	r. p. m.	15,000/11,250
Taper in wheel spindle	Morse No.	1
DRIVE:		
Electric motor of feed box 900 r. p. m.	kW	0.7
Electric motor of wheel slide, 2800 r. p. m.	kW	0.95
Electric motor drives pump 2000 r. p. m., 20 litres per minute (on special order at an extra charge)	kW	0.125
Electric motor of dust exhaust attachment 2300 r. p. m. (on special order at an extra charge)	kW	0.95
DIMENSIONS AND WEIGHTS:		
Dimensions of machine	approx. mm	2250 X 1180 X 2285
Net weight of machine with standard equipment and motors	approx. kg	2800
Weight of feed box motor	approx. kg	25.5
Weight of wheel slide motor	approx. kg	12.5
Weight of electric motor drives pump	approx. kg	11
Weight of electric motor for dust exhaust attachment	approx. kg	13
Weight of railway packing	approx. kg	210
Weight of seaworthy packing	approx. kg	380
Dimensions of railway packing	approx. cm	238 X 130 X 250
Contents boxed	approx. cu. metres	6.5

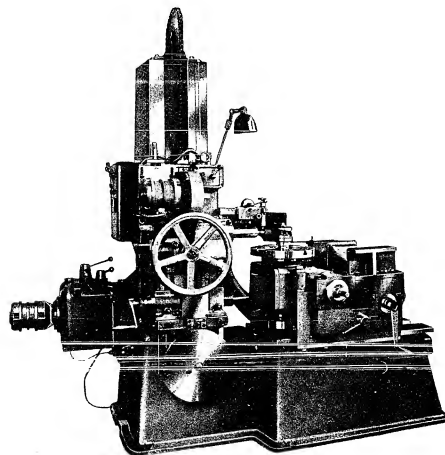
IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY:

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

STROJEXPORT

PRAHA - CZECHOSLOVAKIA

Universal Cam Grinding Machine



is a Special Heavy Duty Machine designed for the grinding of peripheral, face or cylindrical cams by mechanical copying from templates. Equally suitable for single part and mass production.



THE BED forms a rigid, wide and sturdy base for the machine, resisting distorting influences and forces set up during operation. The side walls are reinforced by diagonal ribs. The flat, wide guideways are accurately ground.

THE FEED BOX is attached to the left hand side of the bed and driven by a self-contained flange mounted electric motor. The movement is transmitted from the box to the template spindle on the one hand and to the workhead drive box on the other.

THE TEMPLATE SPINDLE carrying a worm wheel runs in an eccentric bush which can be rotated within the range of 60° in order to eliminate the play between the worm and worm wheel. The eccentric bush is arranged in the left-hand part of the bed. Templates, the strokes of which are transmitted to the cam being ground at a ratio of 1:1, are fixed to the head of the spindle.

THE WORKHEAD DRIVE BOX is bolted to the rear of the slide. The rotary movement is transmitted from the drive box through spur gears, a dog coupling, a set of pallid bevel gears and a worm to a worm wheel on the work spindle.

THE WORKHEAD. The work spindle has 8 rates of rotary feed which are engaged by 2 levers arranged at the top of the feed box cover. When the power feed is disengaged by the lever at the front of the slide the spindle may also be rotated by hand by means of a crank. The large indexing ring on the shaft of the crank is graduated in 5 minute divisions. One revolution of the crank gives the spindle with the cam, which is being machined, a rotary movement of 5° . The spindle runs in Timken bearings the play of which, if any, can easily be taken up.

The work spindle carries two clamping plates, one for working with the spindle in its horizontal position, i. e. for grinding peripheral and face cams and the other for working with the spindle in its vertical position, i. e. for grinding cylindrical cams. On their front surfaces both clamping plates are provided with T-slots arranged at a distance of 80° from each other. The workhead swivels on heavily dimensioned pins by operating a hand crank.

The divided worm wheel on the workhead spindle enables the play between the worm and the worm wheel to be reduced to a minimum.

The slide with the workhead is moved along the bed by a hand crank. The large indexing ring on the shaft of the crank is graduated in 0.05 mm (approximately 0.002") divisions and facilitates a correct setting of the grinding depth. One revolution of the crank gives the slide a movement of 5 mm (0.2").

THE WHEEL SLIDE moves along the guideways arranged on the column and is balanced by a counter-weight inside the column suspended on a chain carried by a large pulley. The slide is moved for adjustment by hand by means of a large wheel and fixed in the required position by means of a folding adjusting pawl and ratchet. During operation the pawl is disengaged and the wheel slide moved along the stand mechanically in accordance with the rising and dropping shape of the rotating template. The wheel slide is driven by a self-contained electric motor arranged to slide up and down. The motor pulley drives the wheel spindle, located in the central part of the wheel slide, by means of a flat belt. The sliding arrangement of the electric motor serves for tightening the belt.

To the bottom part of the wheel slide a welded steel bracket is bolted, the guideways of which carry a cast iron bracket with the copying roller holder. The cast iron bracket is held in position by bolts inserted into T-slots. The copying roller runs on needle bearings revolving directly on the pin.

The roller is coarsely adjusted for height in relation to the template by moving the cast iron bracket up or down. The accurate adjustment is made and the depth of cut set by means of a crank, a pair of bevel gears and a screw. The indexing ring on the shaft of the crank has 0.02 mm (approximately 0.0008") divisions. One revolution of the crank alters the distance between the roller and the wheel spindle by 4 mm (approximately 0.16").

The centre-line of the roller is aligned with the engraved line on the template by a special setting bar. The roller with its holder can be moved sideways on the cast iron bracket, when the fixing bolts are loosened, by set screws at the sides of the roller holder. The grinding wheel can be adjusted for height in relation to the cam being ground with an accuracy of 0.1 mm (0.004") by reading the movement on a scale with a vernier and a magnifying glass arranged on the upper part of the wheel slide.

LUBRICATION. The feed box and the bearings of the gears in the bed are centrally lubricated by a piston oil pump driven by a cam in the feed box. The gears in the bed, drive box and headstock run in an oil bath. The wheel slide, and the bed and column ways are lubricated by hand by means of a grease gun. The wheel spindle is lubricated by hand.

COOLING ATTACHMENT (supplied only on special order at an extra charge). A coolant tank is formed at the rear of the bed. An electric motor-driven pump delivers the coolant through pipes with joints, a cock and a nozzle to the work. The used coolant and the chips are collected either in a separate vessel or in a two-part pan, depending on the position of the workhead spindle. In the overflow tank incorporated in the coolant tank inside the bed the chips are separated from the returning coolant. If the customer does not order the cooling equipment with the machine, he can order it later at any time and easily fit it to the machine after unscrewing and removing the special cover plates.

THE DUST EXHAUST ATTACHMENT (supplied only on special order at an extra charge). A centrifugal separator with a fan fitted underneath the machine exhausts, by means of a nozzle and pipe line, the fine chips and dust produced by grinding and thereby improves the working atmosphere.

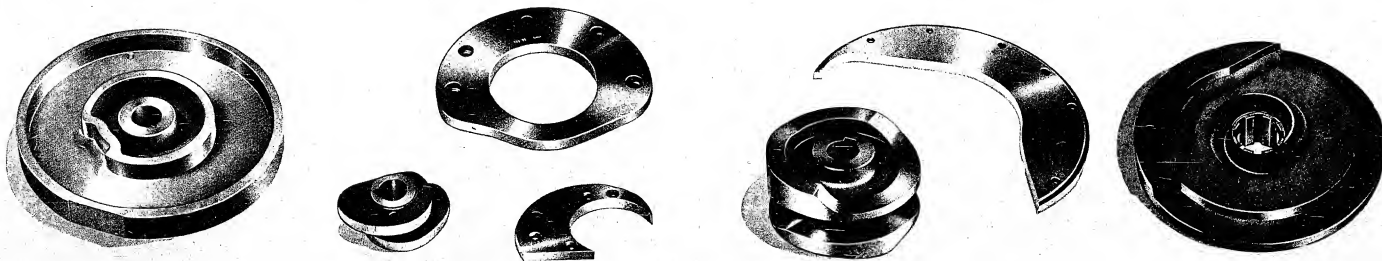
ELECTRICAL EQUIPMENT. The electrical equipment cabinet is suspended on the left-hand side of the column. It includes, among other items, a switch for reversing the wheel spindle rotation, a switch for the motor driven coolant pump and a light switch. The switches for the feed box and wheel slide motors are arranged at the top of the wheel slide within convenient reach of the operator.

We normally supply motors to suit three phase, 50 cycles, 550/230 Volts and electrical equipment for three phase 380 Volts designed to EBC standard specifications. In case the customer requires a machine with electrical equipment designed for a different system of electric power or in accordance with different standard specifications we can supply it at a charge for the difference in cost.

THE OPERATION OF THE MACHINE is simple and made easy by clear, conveniently arranged instruction plates.

STANDARD EQUIPMENT (supplied with the machine, the price being included in the price of the machine): Tools for the maintenance and operation of the machine - table for finished parts - 2 setting bars - clamping screw for the work spindle - wheel truing device - operating instruction booklet.

OPTIONAL EQUIPMENT (supplied only on special order at an extra charge): Dust exhaust attachment - cooling attachment.



SPECIFICATIONS

Maximum weight of the casting of Zn and Cu alloys	kg	9.1	oz	11
Maximum weight of the casting of light metal alloys	kg	0.2	oz	7
Maximum area of castings in the parting line of the die	cm ²	60	sq. in.	9.5
for copper and zinc alloys	cm ²	80	sq. in.	12.5
for light metal alloys	shots	1200-1400	shots	1300-1500

Average production rate in 8 hours

Closing Capacity

Working pressure	kg/cm ²	120	lbs/sq. in.	1700
Pressure of closing platen (up stroke)	kg	2500	lbs.	5500
Die-closing pressure	kg	3500	lbs.	8700
Die-closing pressure (down stroke)	kg	4500	lbs.	10000
Stroke of closing platen	mm	250	in.	9.8"
Opening of machine — Parting-Line-System max.	mm	52	in.	2.05"
Opening of machine — Center-Gate-System max.	mm	275	in.	10.8"
	mm	417	in.	16.3"
	mm	167	in.	6.5"

Pressing Capacity

Working pressure	kg/cm ²	120	lbs/sq. in.	1700
Adjustable pressure applied to metal	kg	5000	lbs.	18700
Pressure of pressing platen, down stroke	kg	1500	lbs.	4200
Gate cutting pressure	kg	3000	lbs.	6700
Pressure of counter piston, down stroke	kg	1000	lbs.	2200
Stroke of pressing platen	mm	140	in.	5.5"
Stroke of counter piston	mm	80	in.	3.15"
Pipe for pressure water	G mm	38/27	in.	1.49"/1.06"
Pipe for discharge water	G	15/7	in.	0.58"
Consumption of pressure water, including core pullers, per shot	approx. litres	4	gals.	0.88

Die Casting Machine

Floor space required	mm	1430 x 450	in.	57 x 18
Height of machine	mm	1800	in.	71
Net weight of machine with standard accessories	approx. kg	1220	lbs.	2750
Gross weight of machine packed for rail	approx. kg	1450	lbs.	3110
Gross weight of machine packed for overseas	approx. kg	1550	lbs.	3400
Contents boxed	m ³	1	cu. ft.	144

Driving Plant RP 9-23

Capacity	litres/min	27	gals./min.	6
Total contents of accumulator	litres	40	gals.	9
Stroke required for driving platen	mm	1400 x 800	in.	24" x 31"
Net weight	kg	800	lbs.	1760
Gross weight of machine	kg	900	lbs.	1980
Gross weight packed for rail	kg	1000	lbs.	2200
Gross weight packed for overseas	kg	1100	lbs.	2420
Contents boxed	m ³	1	cu. ft.	144

Working Furnace (gas or oil fired)

Crucible contents for heavy metals	kg	50 or 100	lbs	110 or 220
Diameter of furnace	mm	700 or 800	in.	27 1/2" or 31 1/2"
Height of furnace	mm	700	in.	27 1/2"
Weight of crucible for heavy metals	kg	23 or 45	lbs	51 or 99
Net weight of furnace	kg	350 or 580	lbs	770 or 1270
Gross weight of furnace	kg	400 or 660	lbs	880 or 1450
Gross weight packed for rail	kg	450 or 720	lbs	990 or 1580
Gross weight packed for overseas	kg	500 or 780	lbs	1100 or 1710
Contents boxed	m ³	0.65 or 1.1	cu. ft.	23 or 39

Pressure Diameter inch.	Chambers Volume cu. inch.	Specific pressure inside the pressure chamber lbs/sq. inch.	Maximum area of the casting incl. the gate sq. inch.	Weight of the alloy in the pressure chamber lbs			Weight of the casting lbs		
				— 2.4 Al	— 6.2 Zn	— 7.3 Cu	— 2.4 Al	— 6.2 Zn	— 7.3 Cu
1 1/2	4.217	907.75	8.525	—	0.54	1.12	—	0.66	0.77
1 3/4	5.1570	728.6	10.850	—	1.15	1.37	—	0.79	0.94
1 7/8	6.4075	616.0	13.950	0.55	1.43	—	0.375	0.99	—

When ordering, specify voltage, phase and frequency of power supply!

As improvements are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT — PRAHA — CZECHOSLOVAKIA

PRESSURE DIECASTING MACHINE

POLAR 408

PRESSURE DIECASTING MACHINE TYPE 408

is suitable for working up all kinds of non-ferrous metals such as: Zinc, Aluminium, Magnesium, and Copper base Alloys. The machine works both by the centre-gate and parting-line system and has the following characteristic features and advantages:

Ingenious and sturdy construction

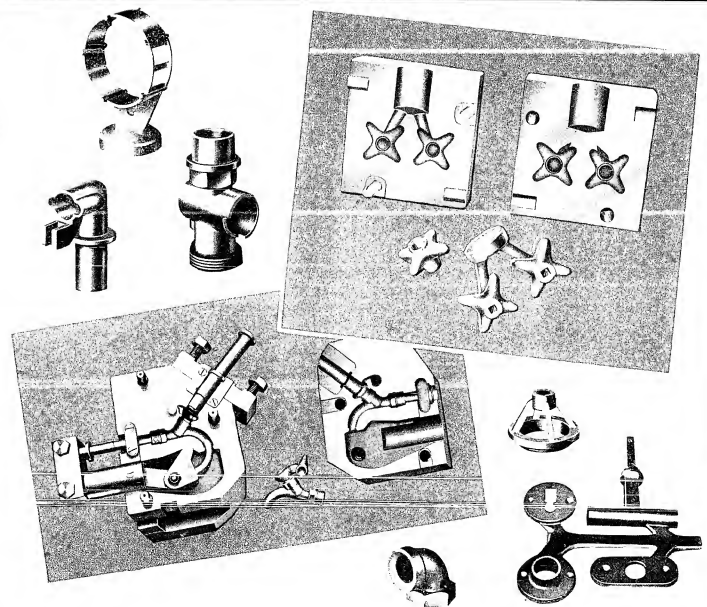
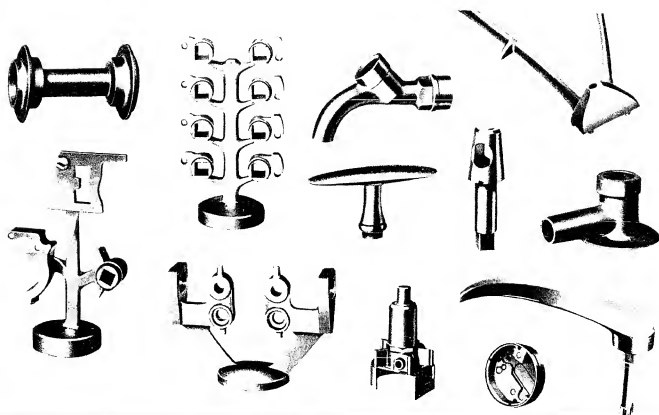
Ease of operation by a single handlever

Economy of production

The Polak 408 pressure diecasting machine is especially well-suited for the mass production of smaller and medium size components of intricate shape, where small weight and neat appearance are of prime importance. It produces castings of an unusual dimensional accuracy and a high-grade surface finish, requiring no subsequent machining. As a rule it is entirely sufficient to remove gates or burr and the castings are ready for assembly. The machine is ideal for the quantity production of parts in the automotive, electrical and optical industries, for builder's and plumber's hardware, household appliances, etc., as per illustrations on the rear of this catalogue.

Description and Operation of the Machine

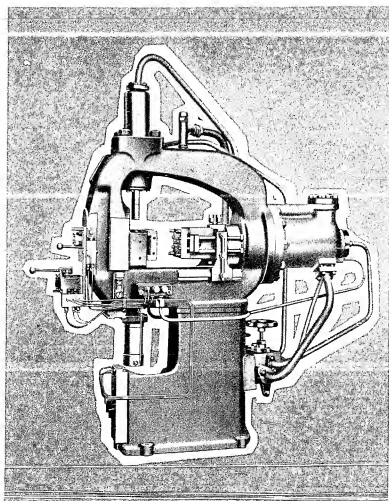
The Polak 408 Machine is illustrated on the front page. It consists mainly of a rigid hollow frame of cast steel mounted on a solid base. The frame allows for easy access and facility of inspection of the die the stationary half of which is fixed on the left-hand side of the frame, the movable half being mounted on the accurately guided dicholder of the closing piston.



The mechanism for opening and closing the die is arranged on the horizontal axis of the frame. The die closing is done by a small feeding piston with small consumption of pressure water. During the die closing the closing cylinder is fitted with discharge water (without pressure) which is supplied from the hollow frame over a check valve. As the full closing pressure is exerted only at the moment of the die closing there is almost no consumption of pressure water at the locking. In the vertical axis of the frame a pressure cylinder is arranged fitted with a plunger which carries the easily interchangeable injection piston. With the parting line system the pressure chamber is provided under the injection piston (Fig. 2) which serves for casting alloys in a plastic state. When using the center-gate system the pressure chamber is arranged as per Fig. 3. The counter piston which is supported by a spring covers the gate prior to the injection of metal and thus prevents the metal from running prematurely into the die. As the injection piston acts on the metal the counter piston moves to its conical seat allowing the metal to enter freely the die. After the injection is completed the metal remaining in the pressure chamber is separated from the gate by the counter piston and ejected.

The Speed of the Injection Piston
can be regulated at will within the given limits

The Control
is effected by a hand-operated single lever distributor fixed on the left of the machine. By shifting the lever to the horizontal position the closing action begins; by pressing it downwards the injection of metal proceeds. Only the forward strokes of the piston are controlled while the downward strokes are effected automatically by constant pressure.



The Pressure Diecasting Machine

can work either by the centre gate system, where the pressure chamber is arranged laterally to the die (Fig. 3) or by the direct injection method (parting line system) where the pressure chamber is in the parting line of the die (Fig. 2).

The centre gate system is used when working up Zn-, Al- and Mg-alloys which are usually cast in a liquid state. Due to their higher melting point the copper base alloys must be worked up at the lowest possible temperature in order to obtain the metal free from air when it enters the die and also to save those parts of the die which come into contact with the metal. During the feeding process the small amount of metal cast on the type 408 having no great heating capacity is subject to considerable loss of heat. Therefore when casting Cu-alloys it is useful to bring the metal from the pressure chamber directly into the die as it is done at the parting line system. With this method the pressure chamber opens simultaneously with the die and is well cooled down by an air current while with the centre gate system the temperature of the pressure chamber, the counter piston and the sprue nozzle (with Cu-alloys) would be too high due to the high working speed of the machine.

The Hydraulic Pressure Plant ARP VIII

shown in Fig. 6 supplies the machine with the necessary pressure water under a pressure of 120 atm. (1,700 lbs/sq. in.) It consists of a pressure pump with an automatic check valve, of an accumulator with a minimum pressure valve and of a driving motor. All these parts are mounted on the amply dimensioned tank.

The Pressure Pump RP 9-23

is built as a high speed three piston pump with a capacity of 27 litres (6 gals) per minute. The main shaft and

The Drawing of Cores

from the finished casting can be done either by the machine itself, if the cores are parallel to the axis of the machine, or by a hydraulic core puller, if they are across the direction of the machine axis. The core pullers are built as standardised units with the necessary drawing power and suitable stroke and are supplied with the machine as standard or optional equipment just as spare pressure chambers and other spare parts specified in our price quotation.

The ejection of the finished castings is accomplished by ejector pins which — according to the kind of castings and the construction of the die — are operated either automatically by stops in opening the die or by means of a hand lever, rack and pinion.

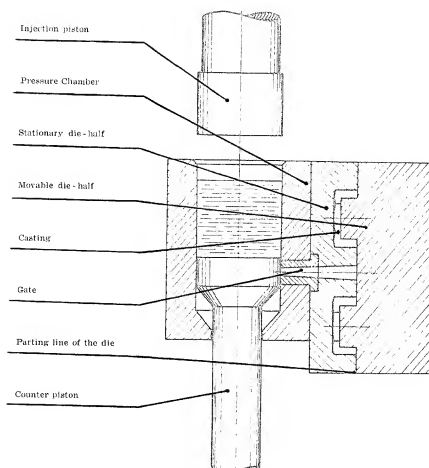
the connecting rod of the pump rotate in anti-friction bearings which are housed in an oiltight crank box and run in an oil bath so that a minimum of attendance is required. The drive is by V-belts from a standard squirrel-cage induction motor with an output of 10 HP and a speed of 1440 r. p. m.

The Automatic Control of Pressure

is effected by a minimum pressure valve in the accumulator and by an automatic pressure valve on the pressure pump. As soon as the working pressure exceeds 120 atm. (1,700 lbs/sq. in.) the automatic check valve opens and the pump runs idle. When the pressure drops the automatic check valve causes the pump to charge water again. In addition, a safety valve is provided which does not allow the pressure to exceed the permissible maximum while the minimum pressure valve prevents the pressure from dropping under the permissible limit.

The Accumulator

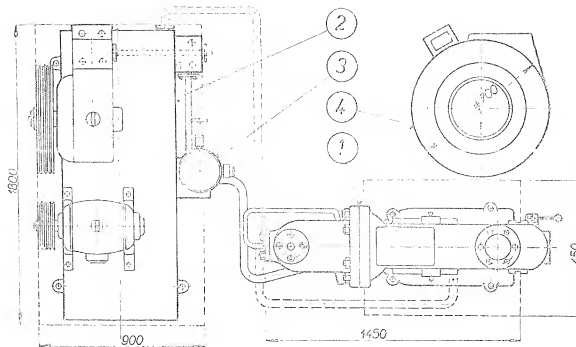
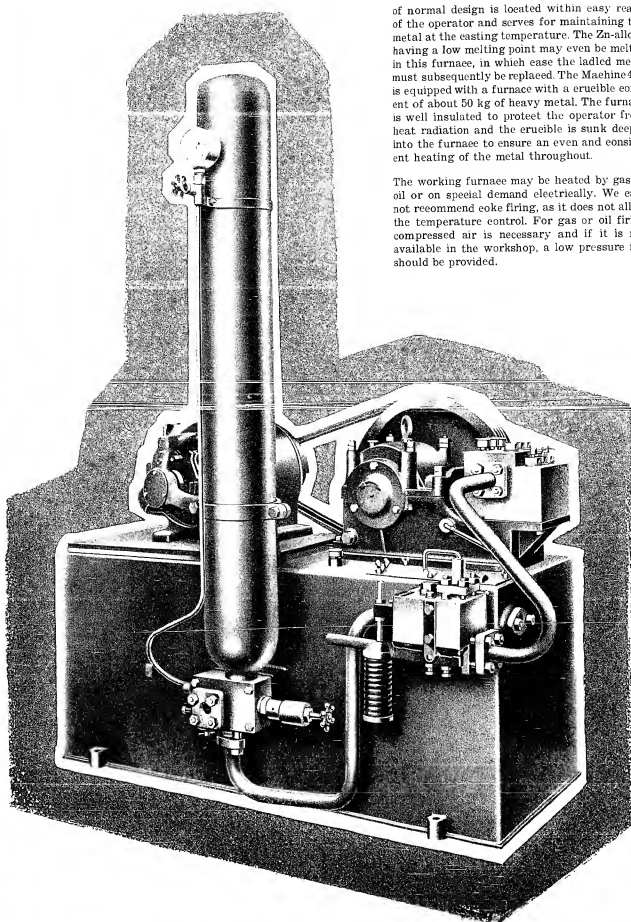
consists of a seamless rolled pressure tube of steel, known as a "bottle", with a content of 40 litres (9 gals) and of a stop valve combined with the minimum valve. The pressure bottle is filled half with pressure water and half with compressed air or Nitrogen, and is designed to permit sudden discharge of water necessary for each operation of the machine, as well as the storage of pressure water supplied by the pressure pump between the individual working cycles. Due to this balancing effect of the accumulator the output of the pressure pump should not be higher than the average water consumption of the machine plus a reserve. Each bottle has to pass a rigid government inspection and is tested for a pressure higher by about 50% than is the actual working pressure. The test chart is sent to the customer with the machine.



The Working Furnace

of normal design is located within easy reach of the operator and serves for maintaining the metal at the casting temperature. The Zn-alloys having a low melting point may even be melted in this furnace, in which case the ladled metal must subsequently be replaced. The Machine 408 is equipped with a furnace with a crucible content of about 50 kg of heavy metal. The furnace is well insulated to protect the operator from heat radiation and the crucible is sunk deeply into the furnace to ensure an even and consistent heating of the metal throughout.

The working furnace may be heated by gas or oil or on special demand electrically. We cannot recommend coke firing, as it does not allow the temperature control. For gas or oil firing compressed air is necessary and if it is not available in the workshop, a low pressure fan should be provided.



The Crucibles

for the furnace are supplied to suit the metal to be melted. For copper-base alloys the crucibles are made of special fire resistant steel, for Zn-alloys crucibles of cast iron or cast steel are employed.

The Working Furnace for Mg-alloys is of special design to prevent the access of air to the molten metal by using sulphur dioxide and thus enabling also this alloy to be worked on a pressure diecasting machine.

The Melting Furnace

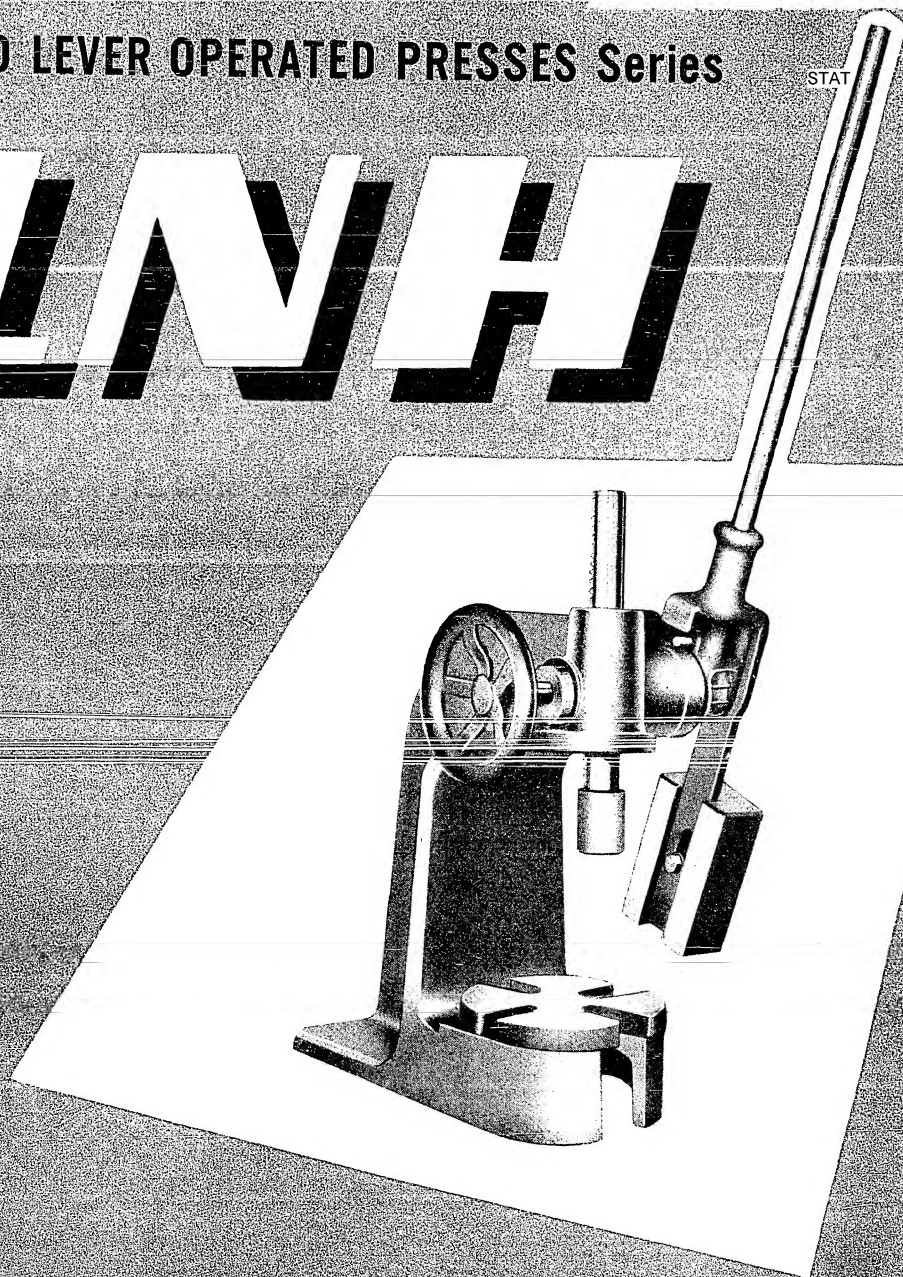
is usually a crucible furnace of the tipping type, suitable for melting and deoxidizing the metal. One or several working furnaces can be charged with molten and pure metal from one melting furnace.

The Location

of the machine (1) is done according to the general layout plan or adapted to the local job requirement, with the exception of the working furnace (4) which must always be placed in strict accordance with the general layout plan, so as to enable the operator to ladle easily the metal. Nor should the accumulator (3) be located too far from the machine to avoid the undesirable severe pressure shocks due to an excessively high water column. If several machines are located in one shop it is advisable to arrange a central pressure plant of a capacity high enough to supply all machines with pressure water. In such a case it is possible to employ one accumulator for two machines. All accumulators are arranged in a circle and interconnected for achieving a better compensation of pressure and a uniform loading of the pressure pump. It is recommended to locate the pressure pumps (2) in a separate room to protect them from dust. The best way of controlling the functions of the pumps is to provide them with a change-over mechanism enabling a certain number of pumps to be continually in action while the other pumps serve only for compensating the pressure at peak output. The piping for the pressure water is supplied separately after the layout plan is definitely fixed.

HAND LEVER OPERATED PRESSES Series

LNH



These machines are particularly adapted to the pressing of arbors, mandrels, bushings, pins, bolts, etc., and to a wide variety of stamping and forming operations in the manufacture of smaller parts, as far as the pressure is high enough to handle such work.

They enable an easy and quiet control of pressure and of its direction. The operation on these machines cannot be replaced by driving in the object by hammer blows because by ramming the part is damaged and loses its accuracy.

SPECIFICATION OF TYPE 600 MACHINE

Maximum permissible weight of casting:

for alloys of heavy metals	kg 1.0 — 2.2 lbs
for aluminium alloys	kg 0.8 — 1.8 lbs

Maximum permissible area of casting in parting line of die:

for alloys of heavy metals	cm ² 150 — 19 sq. inches
for aluminium alloys	cm ² 200 — 30 sq. inches

Average production rate in 8 hours

shots 1000 to 1200

Maximum dieclosing force

tons 70

Pressure applied to metal

tons 3 to 16

Maximum opening of machine

mm 650 — 25 1/2"

Minimum opening of machine (minimum height of die including clamping box)

mm 340 — 13"

Consumption of pressure liquid per shot,

approx.	litres 6.5 — 1.4 gals
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Floor space required for machine,

approx.	mm 900 X 2300 — 35' X 91"
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Maximum height above floor

mm 2500 — 99"

Net weight of machine, approx.

kg 2100 — 4600 lbs

Gross weight of machine, railway packing, approx.

kg 2300 — 5100 lbs

Gross weight of machine, seaworthy packing, approx.

kg 2650 — 5800 lbs

Measurements of packing case

metres 2.5 X 1.8 X 1.5 — 8'2" X 5'11" X 6'3"
--

Type RP XII Pump

Output of pump

litres per min. 40 — 9 gals per min.

Speed of pump

r. p. m. 340

Speed of motor

r. p. m. 1450

Output of motor

kW 11.5

Floor space required for pump

with motor, approx.	mm 500 X 2000 — 35" X 79"
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Net weight, approx.

kg 570 — 1260 lbs

Gross weight, railway packing,

approx.	kg 650 — 1430 lbs
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Gross weight, seaworthy packing,

approx.	kg 770 — 1700 lbs
---------	-------------------

Measurements of packing case

metres 1.1 X 2.2 X 1.5 — 3'8" X 7'3" X 4'11"
--

250 Litre [55 Gal] Accumulator

Contents of bottle

litres 250 — 55 Gal

Working pressure

atm 120 — 1700 psi

Floor space required

mm 800 X 800 — 32" X 32"

Height above floor, approx.

mm 3800 — 150"

Net weight, approx.

kg 670 — 1480 lbs

Gross weight, railway packing,

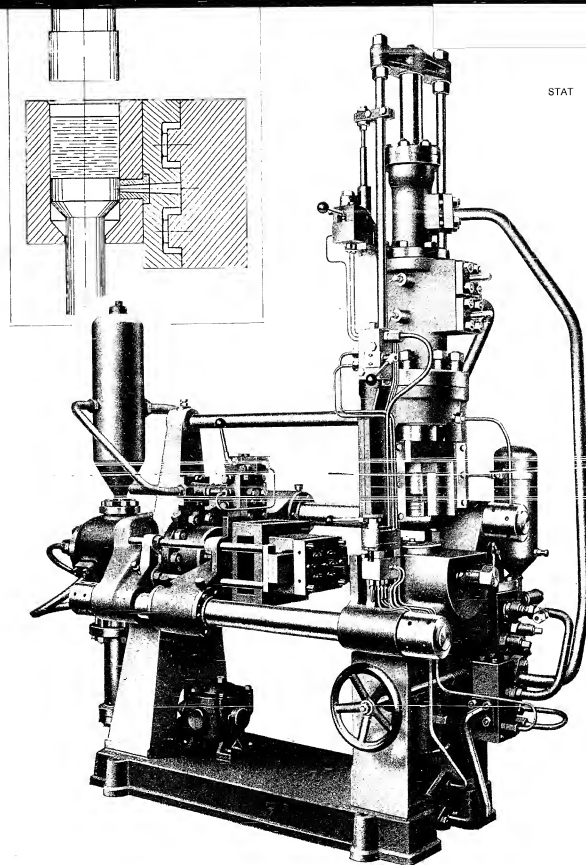
kg 780 — 1720 lbs

Gross weight, seaworthy packing,

approx.	kg 920 — 2030 lbs
---------	-------------------

Measurements of packing case

metres 4 X 1 X 0.9 — 13'2" X 3'4" X 3'
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STROJEXPORT - PRAHA - CZECHOSLOVAKIA

PRESSURE DIECASTING MACHINE

POLAR 600

**PRESSURE DIECASTING MACHINE WITH COLD PRESSURE CHAMBER
FOR CASTING Al, Cu, Zn AND Mg ALLOYS.**

25 YEARS OF EXPERIENCE IN BUILDING PRESSURE DIECASTING MACHINES
WITH COLD PRESSURE CHAMBER.

25 YEARS OF EXPERIENCE IN MANUFACTURING DIES FOR
PRESSURE DIECASTING OF METALS.

Continuous improvements

of design of these machines based on latest practical and theoretical discoveries.

Deliveries

to all industrial countries in Europe and overseas. All the above constitutes a guarantee that these machines will satisfy even the most exacting demands. There is hardly a field in the manufacture of metal parts or objects in which castings produced in fairly large quantities by the pressure diecasting method have not proved superior to castings produced by other methods. That is only natural because

pressure diecastings

have a smooth surface corresponding to the surface of the die, have accurate dimensions and satisfy the requirements of interchangeability. They are fit for immediate assembling, as a rule without machining. They have good mechanical properties and considerable savings in weight are achieved by them. The lowest limit for the use of this method of production is a series of two to four thousand castings of the same kind.

Some examples of applications of the POLÁK 600 machine:

Automotive industry

Door handles, hardware, carburetor bodies, fuel pump bodies, distributors and various other parts of central lubrication systems, various minor decorative moldings, etc.

Electrical engineering industry

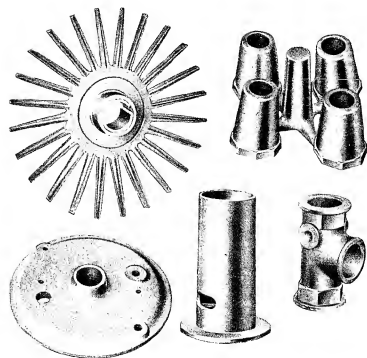
power as well as communications: Telephone apparatuses and equipment, parts of precision measuring instruments, cable connectors, rotors, stators and end shields of small motors, electric conduit boxes, various indicating plates, cable terminals, etc.

Optical industry

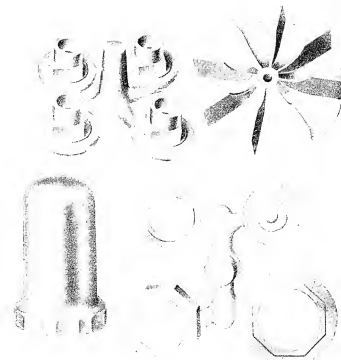
Camera frames and other parts, telescope parts, parts of various optical instruments, etc.

Fittings industry

Water taps, various nuts, parts of special shapes, water meter parts, hose connections, etc.



POLÁK 600



Refrigeration industry

Various door locks and handles, hinges, etc.

Household appliance industry

and manufacture of metal articles of everyday use.

Building and furniture hardware

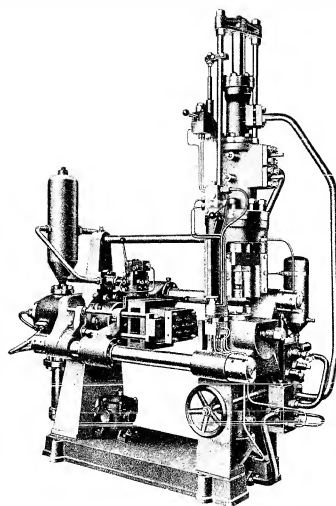
Door handles and shields, window handles and shields, hinges, grips, etc.

The POLÁK 600 Pressure Diecasting Machine

is fully hydraulic, capable of producing casting of zinc or brass up to a weight of 1 kg (2.2 lbs) including the gates and up to an area in the parting line of 120 cm² (19 sq. inches), castings of aluminium up to a weight of 0.8 kg (1.8 lbs) including the gates and up to an area in the parting line of 200 cm² (31 sq. inches).

Outstanding Features

- High output of castings of all kinds of various alloys.
- Simple operation and easy access to all important parts and to the hydraulic line.
- Sturdy design, high grade workmanship and correctly selected material with a view to the high closing and pressing forces which the machine is capable to develop.
- Ease of control and guaranteed correct sequence of individual operations.
- Hydraulic closing of die permitting the fitting of dies of various heights without any adjustment of the closing parts of the machine.
- Cold pressure chamber enabling all alloys suitable for diecasting as known hitherto to be cast — indispensable for casting aluminium and brass alloys.
- High specific pressure upon the metal ensuring smooth surface and good mechanical properties of the castings.
- Cheap and safe operation. There is no fire hazard, the pressure liquid used being an emulsion of water and oil with a pressure of 120 atm (1700 psi).



DESCRIPTION

The base plate is made of cast iron, reinforced with ribs. To the base plate two cast iron legs are bolted one of which carries the closing cylinder, the other the pressure stirrup with the pressure cylinder and pressure chamber.

The closing cylinder

is made of cast steel and is provided with two lugs for the attachment of two columns which join the closing assembly to the pressure assembly.

The closing piston

is made of high grade steel and its surface is carefully ground to reduce the wear of the sealing collars to a minimum. It consists of two parts, the inner small feeding piston and the main closing piston. The feeding piston closes the machine with a small force, the main piston drawing in discharge liquid (without pressure) from a tank arranged above the closing cylinder. The liquid is drawn in through a check valve. As soon as the two halves of the die come into contact the check valve closes and the pressure in the closing cylinder rises to the working pressure of 120 atm (1700 psi). The machine is closed by the main force. This arrangement results in a quick movement of the closing piston, a reduction of the consumption of pressure liquid and of the output of the pump. Thus the power consumption is reduced to a minimum.

The intensifier

raises the pressure of the liquid in the closing cylinder and thus develops the full closing force of the machine of 70 tons.

The pressure cylinder

is fitted to the pressure stirrup of the machine and is made of cast steel. It consists of two parts. The lower part, in which the pressure plunger moves, is provided with a pressing force reducer and de-aerating valves, the upper part forms the so called return cylinder in which a plunger moves which returns the injection piston to its original position.

The pressure plunger

and return plunger are made of high grade steel and carefully ground to reduce the wear of sealing collars to a minimum. To the pressure plunger the injection piston is fitted in a simple manner by means of an extension. This piston is easy to replace.

The pressure stirrup

is made of cast steel and, like the closing cylinder, provided with two lugs for the attachment of the columns. In the stirrup

the cold pressure chamber

is fitted the important parts of which are the cylinder and the gate. These parts are made of special alloy steel to withstand the high thermal and mechanical stresses.

The two horizontal columns

join the closing cylinder to the pressure stirrup. They are made of high grade steel to safely transmit the full closing force of the machine. The arrangement of the columns, which are transversally placed above each other and at an adequate height above the base plate, permits dies with core-pullers in all four walls

to be fitted. The space for the die is limited by the columns as little as possible and the casting can always be placed in the die in a position satisfying the requirement of a correct position of the gate.

The stationary half of the die

is attached to the pressure stirrup. It is provided on its seating surface with a recess for the head of the gate.

The movable half of the die

is attached to the die carrier.

The die carrier

is made of cast steel. It is attached to the closing piston and provided with exchangeable bushes by means of which it is guided on the guide rods.

The small hand distributor

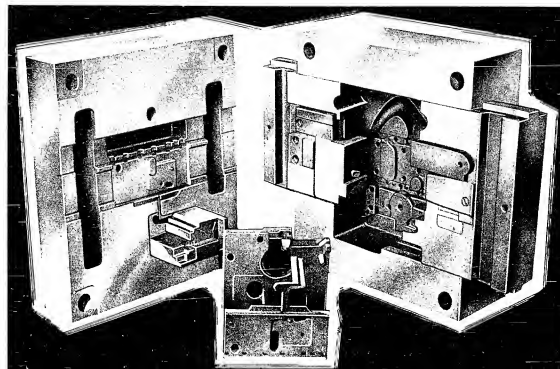
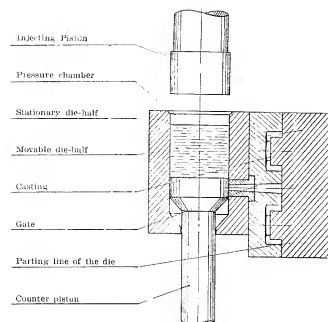
fitted to the pressure stirrup at a convenient height controls the various movements of the machine, i.e. closing, injection and opening. It has a single lever which is easy to handle.

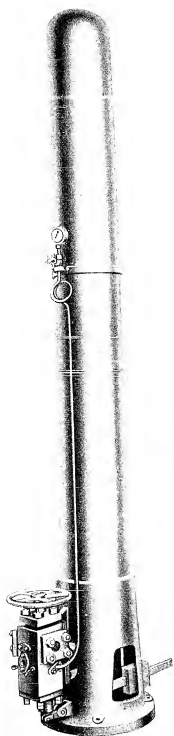
Hydraulic core-pullers

In view of the non-flammable pressure medium used hydraulic core-pullers are used for core drawing throughout. The core-pullers are of simple design, produce considerable forces, are standardized and can be used for any die. They considerably simplify the design of dies and reduce their cost.

Hydraulic ejectors

In cases where automatic ejection of castings cannot be used and hand ejection by means of a rack and pinion would be too tiring hydraulic ejectors are used.



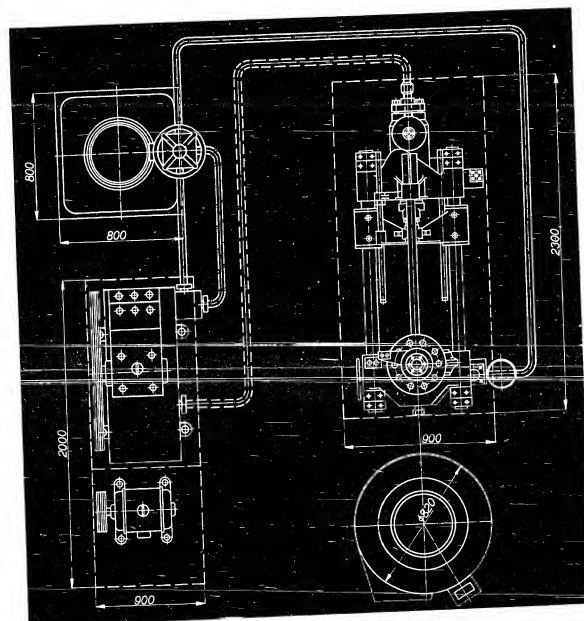
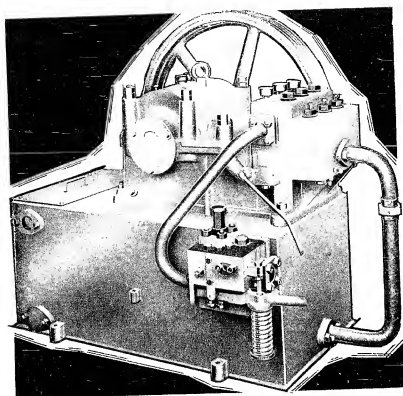


The accumulator

is a hydro-pneumatic unit with a capacity of 250 litres (55 gals). It ensures the immediate availability of the requisite quantity of pressure liquid and permits relatively high speeds and easy control of the closing and injection pistons to be achieved independently of the pump. The output of the pump and, as a result, the electric power consumption are very low.

The pump

is a high speed unit, with horizontal pistons, of simple design, absolutely reliable in operation. It is driven by an electric motor and stops and starts automatically in accordance with a permissible rise or drop of pressure in the accumulator.



The machine, pump and accumulator form the pressure diecasting equipment. Since each of these units forms an independent assembly the machine alone can, for instance, be connected to an existing pressure system. When a fairly large number of machines is being installed a central pressure piping with a central pumping plant can be set up.

We prepare plans of pressure diecasting plants of all sizes

We supply

Hydraulic core-pullers, hydraulic ejectors, working and melting furnaces, gas or oil fired.

We offer our advice on all problems concerning this branch

Our products are continuously being improved upon. The description, illustrations and particulars can therefore not always accurately agree with the latest design of machine and consequently are not binding.

SPECIFICATION

Maximum permissible weight of casting:
for alloys of heavy metals kg 15 — 18 lbs
for aluminium alloys kg 8 — 18 lbs
Maximum permissible area of casting
in parting line of die:
for alloys of heavy metals cm² 600 — 62 sq. inches
for aluminium alloys cm² 800 — 140 sq. inches
Average production rate in 8 hours shots 600 to 600
Maximum die closing force tons 220
Pressure applied to metal tons 10 to 55
Maximum opening of machine without
spacer block mm 1200 — 47"
Minimum opening of machine without
spacer block mm 600 — 23 1/4"
Maximum opening of machine with
spacer block mm 1000 — 39 1/4"

Minimum opening of machine with
spacer block mm 600 — 16"
Consumption of pressure liquid
per shot, approx. litres 40 — 9 Gals
Floor space required for machine,
approx. mm 4200x1900 — 165'x75'
Maximum height above floor mm 3700 — 145'
Net weight of machine, approx. kg 10500 — 23700 lbs
Gross weight of machine, railway
packing, approx. kg 10750 — 23700 lbs
Gross weight of machine, seaway
packing, approx. kg 12000 — 26500 lbs
Measurements of packing case —
3 cases: metres 3.7x1.9x1.5 — 12'2"x6'3"x5'3"
0.2x1.8x1.5 — 1'x4'11"x5'11"
2.5x1.0x0.9 — 8'2"x3'4"x2'11"

Type RP XX Pump

Output of pump litres per min. 60 — 13 Gals per min.
Speed of pump r. p. m. 340
Speed of motor r. p. m. 1440
Output of motor kW 16.5
Floor space required for pump
with motor, approx. mm 1200x2200 — 48"x91"

Net weight, approx. kg 780 — 1680 lbs
Gross weight, railway packing, approx. kg 840 — 1850 lbs
Gross weight, seaway packing, approx. kg 1000 — 2200 lbs
Measurement of packing case
metres 1.3x2.5x1.5 — 4'3"x8'3"x4'11"

500 Litre (110 Gals) Accumulator — Two-Bottle

Contents of bottle litres 500 — 110 Gals
Working pressure atm 120 — 1700 psi
Floor space required mm 1700x1000 — 67"x39"
Height above floor, approx. mm 3800 — 160"
Net weight, approx. kg 1250 — 2760 lbs

Gross weight, railway packing, approx. kg 1400 — 3090 lbs
Gross weight, seaway packing, approx. kg 1700 — 3750 lbs
Measurement of packing case
metres 2.9x1.8x1.1 — 12'10"x9'11"x3'7"

We supply

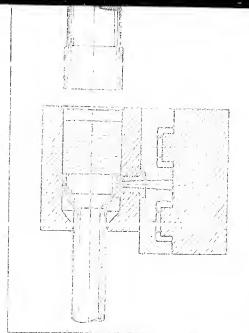
Hydraulic core-pullers — hydraulic ejectors — working and melting furnaces, gas or oil fired — filling cylinders and gates of various diameters.

We manufacture dies for diecasting of metals

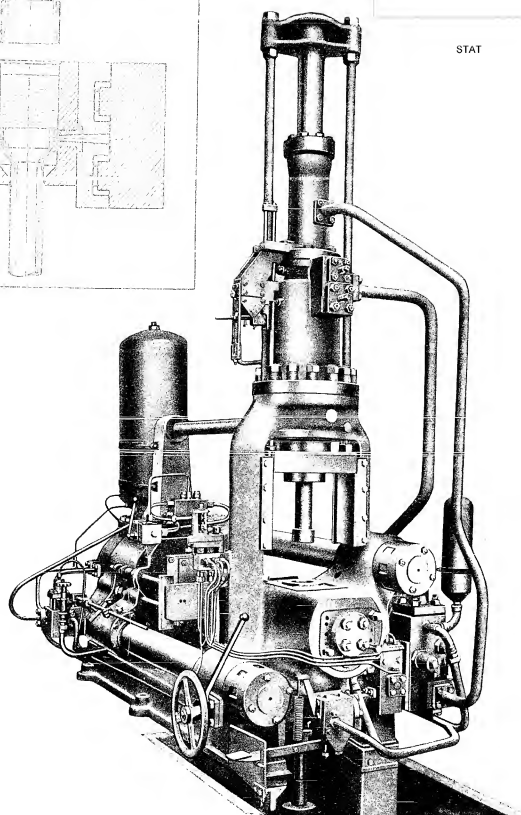
We prepare plans for pressure diecasting plants of all sizes

We offer our advice on all problems concerning this branch

Our products are continuously being improved upon. The description, illustrations and particulars can therefore not always accurately agree with the latest design of machine and consequently are not binding.



STAT



STROJEXPORT - PRAHA - CZECHOSLOVAKIA

PRESSURE DIECASTING MACHINE

2255
POLAR

Pressure diecastings

are characterized by a fine structure, smooth surface, good mechanical properties and accurate dimensions.

In many cases

re-melted alloys are used for the manufacture of these castings. Scrap such as sprues, material remaining in the pressure chamber and rejects can be used again. When changing over from some other manufacturing process to pressure diecasting it may be possible to replace the material used in the past by cheaper material without in any way affecting the quality of the castings.

The high degree of economy

of all methods of shaping material without the use of cutting tools and abrasives is now-a-days being fully appreciated.

Pressure diecasting

of metals is the most favourable method from the point of view of economy. It enables the material to be transformed directly into the finished product and thus reduces losses of material and machining costs.

Interchangeability of parts

which is the fundamental condition of quantity production is satisfied as castings from the same die have practically identical dimensions.

OUTSTANDING FEATURES

- **High output**
- **Cold pressure chamber**
Aluminium alloys, very sensitive to being spoiled by admixtures of iron, can be cast without risk.
- **Hydraulic closing of die**
permits dies of various heights to be fitted without any adjustment of the closing parts of the machine.
- **Wide opening of machine**
and long stroke of closing piston. Exceptionally high dies can be fitted, such as those used, for instance, for the casting of rotors of electric motors, etc.
- **Exchangeable spacer block**
between closing cylinder and die carrier. It is used for normal dies to eliminate dead movement of the piston and has to be removed for high dies.
- **Simple operation**
and easy access to all important parts and to the hydraulic line.
- **Simple and reliable control of machine**
- **The pressure liquid**
is an emulsion of water and oil. Safe operation — no fire hazard.

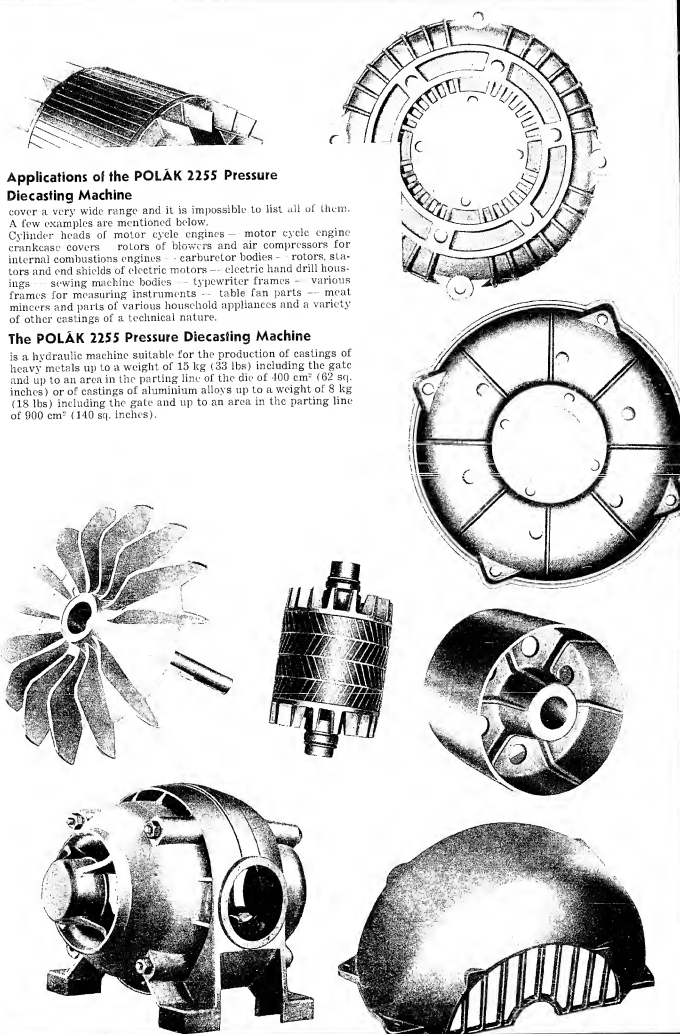
Applications of the POLAK 2255 Pressure Diecasting Machine

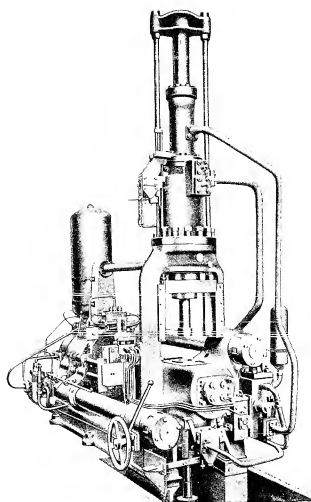
cover a very wide range and it is impossible to list all of them. A few examples are mentioned below.

Cylinder heads of motor cycle engines — motor cycle engine crankcase covers — rotors of blowers and air compressors for internal combustion engines — carburetor bodies — rotors of stators and end shields of electric motors — electric hand drill housings — sewing machine bodies — typewriter frames — various frames for measuring instruments — table fan parts — meat mincers and parts of various household appliances and a variety of other castings of a technical nature.

The POLAK 2255 Pressure Diecasting Machine

is a hydraulic machine suitable for the production of castings of heavy metals up to a weight of 15 kg (33 lbs) including the gate and up to an area in the parting line of the die of 400 cm² (62 sq. inches) or of castings of aluminium alloys up to a weight of 8 kg (18 lbs) including the gate and up to an area in the parting line of 900 cm² (140 sq. inches).





DESCRIPTION

The base plate

is made of cast iron and consists of two main parts joined together. One part carries the closing cylinder, the other part extends below the floor and carries the pressure stirrup.

The closing cylinder

made of cast steel is of generous dimensions. It is provided with two lugs for the attachment of the ends of two columns which join the closing cylinder to the pressure stirrup.

The closing piston

is made of high grade steel. Its surface is ground to reduce the wear of the sealing collars to a minimum. It consists of the inner small feeding piston and the main closing piston. The feeding piston closes the machine with a small force, the main piston drawing-in discharge liquid (without pressure) from a tank arranged above the closing cylinder. The liquid is drawn in through a check valve which is controlled. As soon as the two halves of the die come into contact the check valve closes and the pressure in the closing cylinder rises to the working pressure of 120 atm (1700 psi). The machine is closed by the mean force.

The intensifier

raises the pressure of the liquid in the closing cylinder and thus develops the full closing force of the machine of 220 tons.

The pressure cylinder

is fitted to the pressure stirrup of the machine and is made of cast steel. It consists of two parts. The lower part, in which the pressure plunger moves, is provided with a pressing force reducer and de-aerating valves, the upper part forms the so called return-cylinder in which a piston moves which returns the injection piston to its original position.

The pressure plunger

and return plunger are made of high grade steel and carefully ground. To the pressure plunger the injection piston is fitted in a simple manner by means of an extension. This piston is easy to replace.

The pressure stirrup

is made of cast steel and, like the closing cylinder, provided with two lugs for the attachment of the columns. In the stirrup

the cold pressure chamber

is fitted. The chamber consists of the filling box containing the cylinder and the gate. The filling box is provided with channels for water cooling. The cylinder and gate are made of special alloy steel to withstand the high thermal and mechanical stresses.

The two horizontal columns

join the closing cylinder to the pressure stirrup. They transmit the full closing force and also serve as a guide for the die carrier. They are placed transversally above each other so that the die is easily accessible from all four sides.

The die carrier

is made of cast steel. In case of high dies it is bolted directly to the closing piston. In case of normal dies a spacer block is fitted between the closing piston and the die carrier. The carrier is provided with two exchangeable bushes of generous dimensions by means of which it is guided on the columns.

The hand distributor

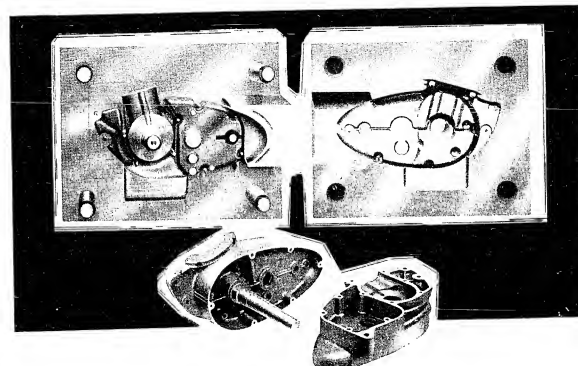
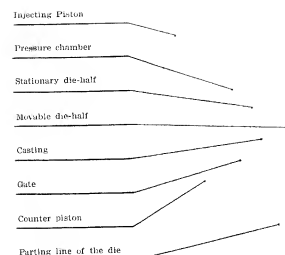
fitted to the pressure stirrup at a convenient height controls the various movements of the machine, i. e. closing, injection and opening. It has a single lever which is easy to operate.

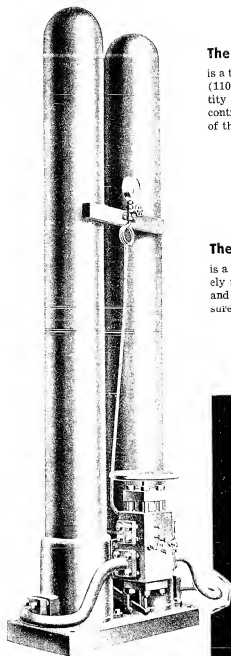
The stationary half

of the die is attached to the pressure stirrup. It is provided on its seating surface with a recess for the head of the gate.

The movable half of the die

is attached to the die carrier by means of the clamping box.



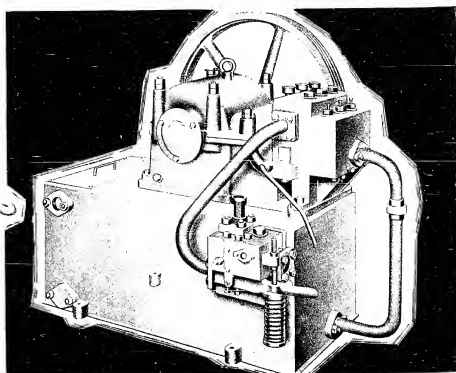


The accumulator

is a two-bottle hydro-pneumatic unit with a total capacity of 500 litres (110 gals). It ensures the immediate availability of the requisite quantity of pressure liquid and permits relatively high speeds and easy control of the closing and injection pistons to be achieved independent of the pump.

The pump

is a high speed unit with horizontal pistons, of simple design, absolutely reliable in operation. It is driven by an electric motor and stops and starts automatically in accordance with the rise and drop of pressure in the accumulator within permissible limits.



The machine, pump and accumulator form the pressure diecasting equipment. Since each of these units forms an independent assembly the machine alone can, for instance, be connected to an existing pressure system. When a fairly large number of machines is being installed a central pressure piping with a central pumping plant can be set up.

Maximum permissible weight of casting:
for alloys of heavy metals kg 1 — 8.8 lbs
for aluminium alloys kg 1.8 — 4.0 lbs

Maximum permissible area of casting in parting line of die:
for alloys of heavy metals cm² 200 — 31 sq. inches
for aluminium alloys cm² 600 — 62 sq. inches

Average production rate per hour — depending on casting — shots 70 to 120

Maximum dieclosing force tons 315

Pressure applied to metal tons 6.5 to 22 to 28

Maximum opening of machine mm 1000 — 39"

Minimum opening of machine (minimum height of die including clamping box) mm 550 — 21"

Consumption of pressure liquid per shot, approx. litres 18 — 4.9 gals

Floor space required for machine, approx. mm 2000 X 1700 — 100" X 67"

Maximum height above floor mm 2150 — 85"

Maximum depth below floor mm 805 — 31"

Net weight of machine, approx. kg 4500 — 9900 lbs

Gross weight of machine, railway packing, approx. kg 4500 — 9900 lbs

Gross weight of machine, seaworthy packing, approx. kg 4670 — 10300 lbs

Measurement of packing case metres 3.2 X 1.8 X 1.9 — 10'6" X 5'11" X 6'3"

Type RP XX Pump

Output of pump litres per min. 60 — 13 Gals per min.

Speed of pump r. p. m. 360

Speed of motor r. p. m. 1440

Output of motor kW 18.5

Floor space required for pump with motor, approx. mm 1200 X 2000 — 48" X 81"

Net weight, approx. kg 760 — 1680 lbs

Gross weight, railway packing, approx. kg 840 — 1850 lbs

Gross weight, seaworthy packing, approx. kg 1000 — 2200 lbs

Measurement of packing case metres 1.3 X 2.5 X 1.5 — 4'3" X 8'3" X 4'11"

250 Litre [55 Gal] Accumulator

Contents of bottles litres 250 — 55 Gals

Working pressure atm 120 — 1700 psi

Floor space required mm 800 X 800 — 32" X 32"

Height above floor, approx. mm 2800 — 109"

Net weight, approx. kg 670 — 1480 lbs

Gross weight, railway packing, approx. kg 780 — 1720 lbs

Gross weight, seaworthy packing, approx. kg 920 — 2030 lbs

Measurements of packing case metres 1 X 1 X 0.8 — 32" X 31" X 3"

We supply

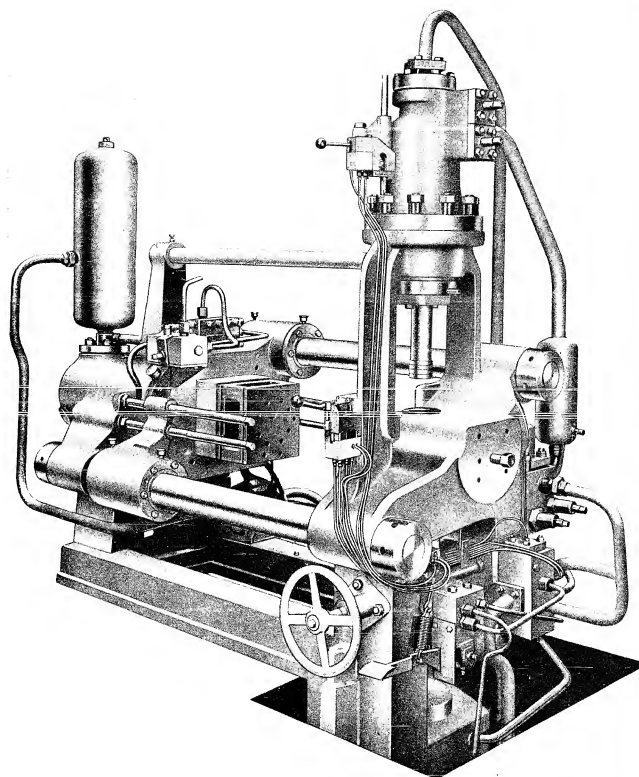
Hydraulic core-pullers — hydraulic ejectors — working and melting furnaces, gas and oil fired — filling cylinders and gates of various diameters

We manufacture dies for diecasting of metals

We prepare plans for pressure diecasting plants of all sizes

We offer our advice on all problems concerning this branch

Our products are continuously being improved upon. The description, illustrations and particulars can therefore not always accurately agree with the latest design of machine and consequently are not binding.



PRESSURE DIECASTING MACHINE

900-XVI

900-XVI

POLAK 900-XVI Pressure Diecasting Machine
with cold pressure chamber

Modern production

demand reliable, simple and safe machines with the highest possible rate of production and simple and easy control.

Hydraulic machines

satisfy these demands and, at the same time, permit high pressures and heavy forces to be developed with perfect safety with comparatively small dimensions of machines.

Pressure diecasting machines

of our manufacture are fully hydraulic and operate with a pressure of the operating liquid of 120 atm (1700 psi). The relatively high speeds of the various movements and ease of control of these speeds make the machines easily adaptable to operating conditions and result in a high output.

Pressure diecasting of metals — a direct transformation of material into the finished product

Pressure diecastings have a smooth surface and accurate dimensions and castings from the same die are practically absolutely identical and satisfy the requirement of interchangeability. They require only little machining or none at all and in many cases can be fitted immediately. They have good mechanical properties. Considerable savings in weight are obtained by them due to their relatively thin walls.

The use of re-melted alloys

and possibility of utilizing even scrap such as sprues, material remaining in the pressure chamber, rejects, etc. without, in the majority of cases, affecting the quality of the castings makes pressure diecasting one of the most economical manufacturing processes.

OUTSTANDING FEATURES

- High output of castings of all kinds of various alloys suitable for diecasting.
- Simple operation and easy access to all important parts and to the hydraulic line.
- Ease of control. An infinitely variable control of the closing and injection piston speeds within a wide range and a control, by steps, of the pressing force make the machine highly adaptable to the operating conditions most suitable for the various alloys.
- Quick and easy exchange of dies due to the fact that the hydraulic closing of the die permits the fitting of dies of various heights without any adjustment of the closing parts of the machine.
- Cold pressure chamber. The pressure chamber is separate from the die. The metal can be cast at the lowest possible temperature. This considerably increases the life of the die. The vertical arrangement of the pressure chamber eliminates every possibility of air being enclosed in the chamber and forced into the cavity of the die.
- High specific pressure upon the metal. The castings have a smooth surface and a fine structure which gives them the best mechanical properties.
- Cheap and safe operation. There is no fire hazard because the pressure liquid is an emulsion of water and oil.

Applications of the POLAK 900-XVI Pressure Diecasting Machine

A few industries in which diecasting has been adopted on a large scale are listed below.

Automotive industry

various decorative mouldings, carburetor bodies, central lubrication pump bodies, oil filter bodies, motor-cycle cylinder heads, etc.

Electrical engineering industry

power as well as communications — various covers and frames of measuring instruments, switch boxes, rotors, stators, end shields and fans of electric motors, etc.

Optical industry

camera frames, telescope parts, parts such as stands of various optical instruments, etc.

Fittings industry

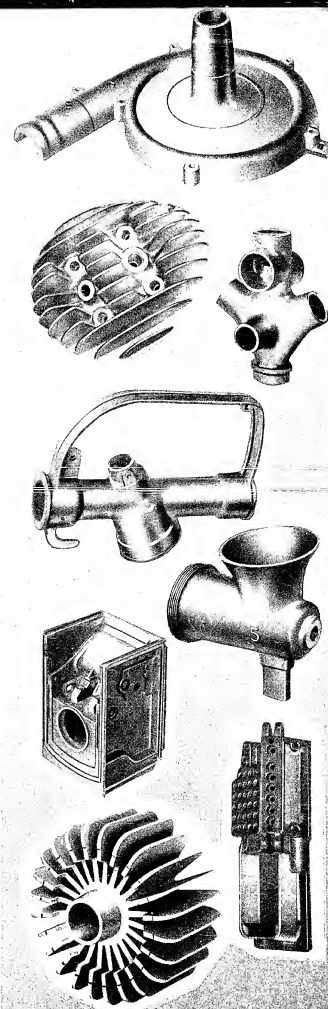
water taps, sets of bathroom fittings, parts of special shapes, water meter parts, hose connections, etc.

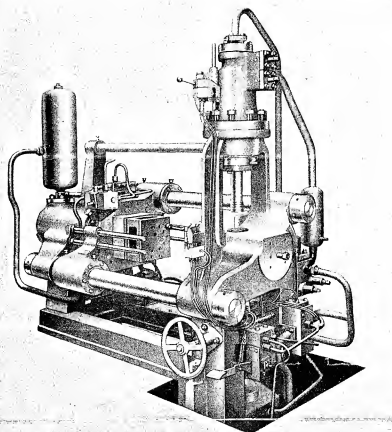
Household appliance industry

meat mincers, coffee grinders, fruit presses, vacuum cleaner parts, table fans, etc.

The POLAK 900-XVI Pressure Diecasting Machine

is fully automatic and suitable for the production of castings of aluminium, magnesium and zinc alloys and of brass.





DESCRIPTION

The base plate

is made of cast iron and consists of the part carrying the closing cylinder and the part carrying the pressure stirrup. The two parts are bolted together. The part carrying the pressure stirrup extends below the floor and the lower hydraulic piston is fitted inside it.

The closing cylinder

is made of cast steel and is provided with two lugs for the attachment of the ends of two columns which join the closing cylinder to the pressure stirrup.

The closing piston

is made of steel. Its surface is carefully ground to reduce the wear of the sealing collars to a minimum. It consists of two parts, the inner small feeding piston and the main closing piston. The feeding piston closes the machine with a small force, the main piston drawing in discharge liquid (without pressure) from a tank arranged above the closing cylinder. The liquid is drawn in through a check

valve. As soon as the two halves of the die come into contact the check valve closes and the pressure in the closing cylinder rises to the working pressure of 120 atm (1760 psi). The machine is closed by the mean force.

The intensifier

raises the pressure in the closing cylinder and thus develops the full closing force of the machine.

The pressure cylinder

is fitted to the pressure stirrup of the machine and is made of cast steel. It is provided with a pressing force reducer and de-aerating valves.

The pressure plunger

is made of steel and carefully ground. To the pressure plunger the injection piston is fitted in a simple manner by means of an extension. This piston is easy to replace. The pressure stirrup is made of cast steel and, like the closing cylinder, provided with two lugs for the attachment of the columns. In the stirrup

the cold pressure chamber

is fitted which consists of the filling box containing the cylinder and the gate. The filling box is provided with channels for water cooling. The cylinder and gate are made of special alloy steel to withstand the high thermal and mechanical stresses.

The two horizontal columns

join the closing cylinder to the pressure stirrup. They transmit the full closing force and also serve as a guide for the die carrier. They are placed transversally above each other so that the die is easily accessible from all four sides.

The die carrier

is made of cast steel and provided with two exchangeable bushes of generous dimensions by means of which it is guided on the columns.

The hand distributor

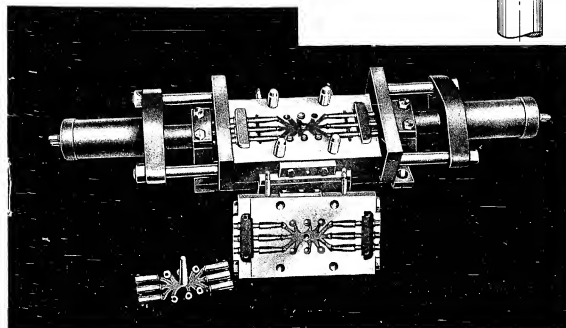
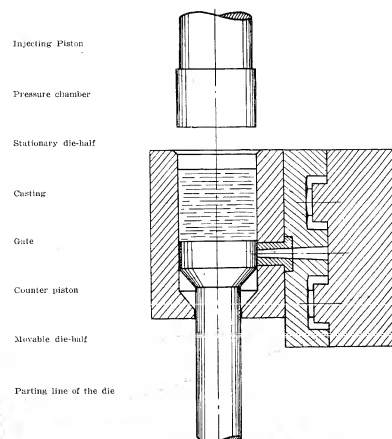
fitted to the pressure stirrup at a convenient height controls the various movements of the machine, i. e. closing, injection and opening.

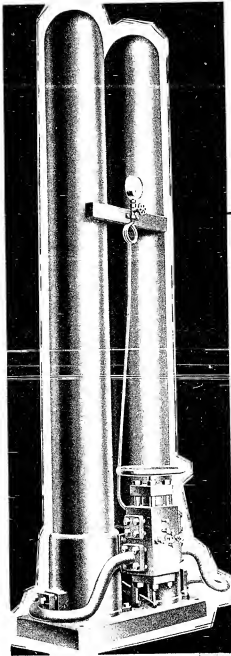
The fixed half of the die

is attached to the pressure stirrup. It is provided on its seating surface with a recess for the head of the gate.

The moving half of the die

is attached to the die carrier by means of the clamping box.



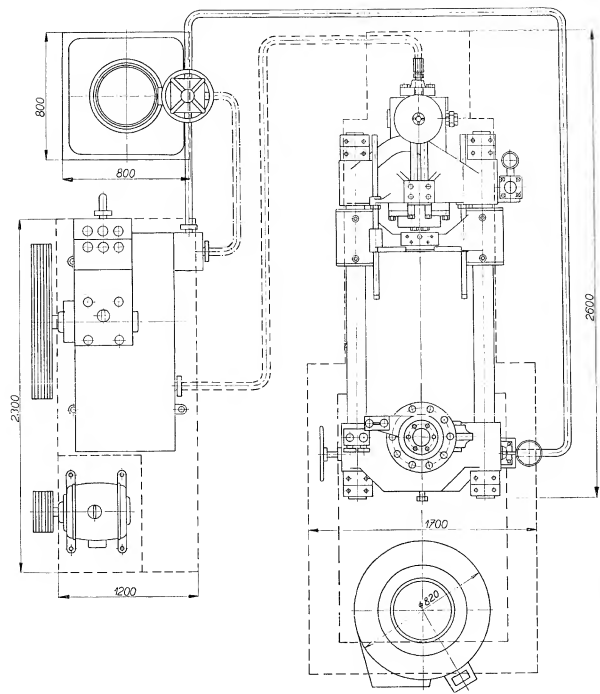
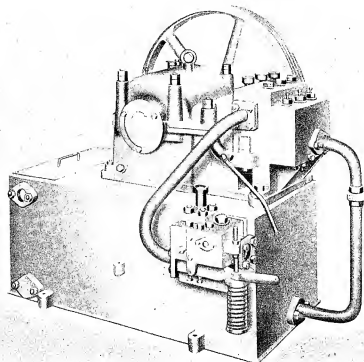


The accumulator

is a hydro-pneumatic unit with a capacity of 250 litres (55 gals). It ensures the immediate availability of the requisite quantity of pressure liquid and permits relatively high speeds and easy control of the closing and injection pistons to be achieved independently of the pump. The output of the pump and, as a result, the electric power consumption are very low.

The pump

is a high speed unit, with horizontal pistons, of simple design, absolutely reliable in operation. It is driven by an electric motor and stops and starts automatically in accordance with the permissible rise or drop of pressure in the accumulator.



The machine, pump and accumulator form the pressure diecasting equipment. Since each of these units forms an independent assembly the machine alone can, for instance, be connected to an existing pressure system. When a fairly large number of machines is being installed a central pressure piping with a central pumping plant can be set up.

SPECIFICATION OF POLAK TYPE 5065 MACHINE

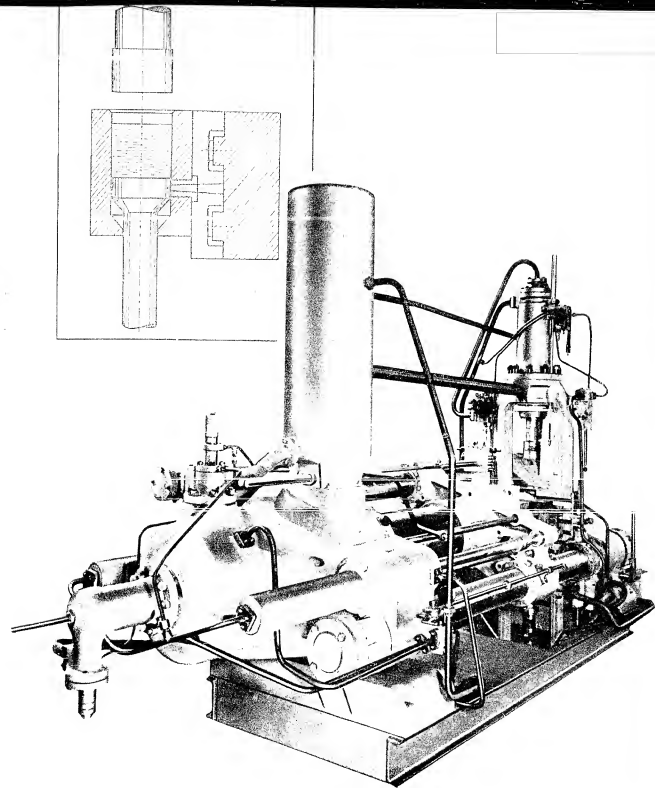
Maximum permissible weight of casting:		Minimum opening of machine without spacer block	
for alloys of heavy metals	kg 10 — 33 lbs	spacer block	mm 1600 — 63"
for aluminium alloys	kg 10 — 33 lbs	Minimum opening of machine with spacer block	mm 600 — 24"
Maximum permissible area of casting in parting line of die:		Consumption of pressure liquid per shot, approx.	
for alloys of heavy metals	cm ² 800 — 124 sq. inches	litres 90 — 20 gals	
for aluminium alloys	cm ² 1000 — 233 sq. inches	Floor space required for machine, approx.	
Average production rate per hour — depending on casting		mm 7000 X 2000 — 29' X 6'7"	
Maximum die closing force	tons 600	Maximum height above floor	mm 3500 — 11'6"
Pressure applied to metal	tons 11 to 44 to 70	Maximum depth below floor	mm 1800 — 5'11"
Maximum opening of machine without spacer block		Net weight of machine, approx.	kg 22500 — 49600 lbs
mm 2200 — 86"		Gross weight of machine, railway packing, approx.	kg 23000 — 50700 lbs
Maximum opening of machine with spacer block		Gross weight of machine, seaworthy packing, approx.	kg 26500 — 58400 lbs
mm 1000 — 39 1/8"			

Type RP XXX Pump

Output of pump	litres per min. 300 — 22 gals per min.	Floor space required for pump with motor, approx.	mm 1200 X 2000 — 48" X 85"
Speed of pump	r. p. m. 340	Net weight, approx.	kg 900 — 1980 lbs
Speed of motor	r. p. m. 1440	Gross weight, railway packing, approx.	kg 1050 — 2310 lbs
Output of motor	kW 35	Gross weight, seaworthy packing, approx.	kg 1200 — 2640 lbs

750 Litre (165 gal) Accumulator — Three-Bottle

Contents of bottle	litres 750 — 165 gal	Net weight, approx.	kg 2115 — 4660 lbs
Working pressure	atm 120 — 1700 psi	Gross weight, railway packing, approx.	kg 2400 — 5290 lbs
Floor space required	mm 1300 X 1000 — 43" X 39"	Gross weight, seaworthy packing, approx.	kg 2800 — 6170 lbs
Height above floor, approx.	mm 900 — 35"		



STROJEXPORT - PRAHA - CZECHOSLOVAKIA

PRESSURE DIECASTING MACHINE

POLAK
5065

5065

POLAK 5065 PRESSURE DIECASTING MACHINE WITH COLD PRESSURE CHAMBER

The direct transformation of material into the finished product
is an ideal which pressure diecasting closely approaches.

Pressure diecasting

into permanent metal dies produces castings with a smooth surface which corresponds to the surface of the die. The dimensions of the castings can be kept within close limits. Castings from the same die are practically absolutely identical and satisfy the requirement of interchangeability. In the majority of cases they need not be machined at all and can be fitted immediately.

High strengths

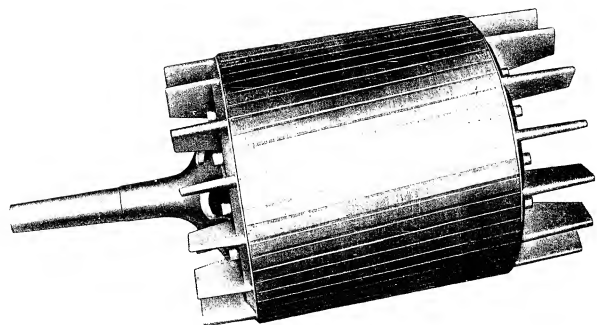
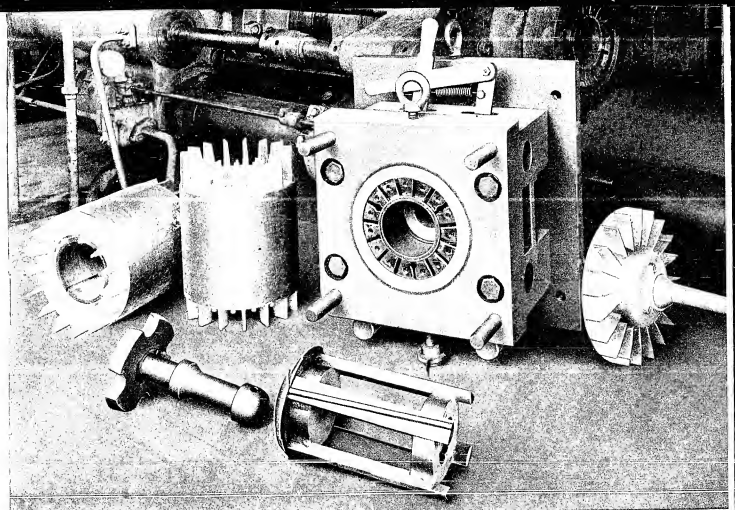
of castings result in a considerable saving of material in view of the fact that walls can be made thinner.

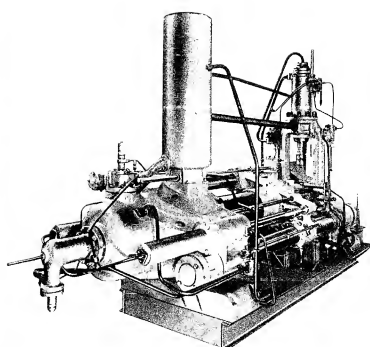
Some examples of applications of the POLAK 5065

Crank cases, crank case covers and cylinder heads of motor cycle engines — Rotors, stators, end shields and fans of electric motors — Frames and parts of typewriters and calculating machines — Parts of automatic scales for shops — Frames and stands of various optical and measuring instruments — Parts of household refrigerators, vacuum cleaners, floor polishers and various other household appliances. Various other castings whenever the quantity required exceeds 2 to 4000 and where their surface, weight, accurate dimensions and mechanical properties are of importance.

OUTSTANDING FEATURES

- High rate of production of accurate, high grade castings.
- Two-column design limiting the access to the die to a very small extent. The fitting of the die is quick and its inspection during operation easy.
- Hydraulic closing of die. Dies of various heights can be fitted without any adjustment of the closing parts of the machine.
- Wide opening of machine permits even abnormally high dies to be fitted.
- Cold pressure chamber and high specific pressure upon metal. The casting temperature of the metal is the lowest possible which considerably increases the life of the die.
- Vertical arrangement of pressure chamber eliminates the possibility of air being forced into the hollow of the mould which would produce air bubbles in the casting.
- Simple operation and easy access to all important parts and to the hydraulic line.
- Simple and reliable control.
- Safe operation-no fire hazard, the pressure liquid used being an emulsion of water and oil.





DESCRIPTION

The type 5065 Pressure Diecasting Machine

consists of the vertical hydraulic part known as the pressure stirrup in which the pressure chamber and the hydraulically operated counter piston are fitted, and of the horizontal closing cylinder. The two parts are joined by two columns.

The base plate

is welded of heavy mild steel sections.

The closing cylinder

is made of cast steel and provided with two lugs for the fitting of the hydraulic cylinders which move the closing piston, i.e. close and open the machine. In addition to that the cylinder has two further

big lugs for the attachment of the columns joining the closing cylinder to the pressure stirrup.

The powerful closing piston

is made of special material and its surface is carefully ground to reduce the wear of sealing collars to a minimum. The piston is moved by two hydraulic cylinders fitted on either side of the closing cylinder and connected with the die carrier by means of pull-rods. When the closing piston moves forward, i.e. when the machine is being closed, the closing piston draws discharge liquid (without pressure) into the cylinder from a tank arranged above this cylinder. The liquid is drawn in through a filter and a check valve which is controlled. At the moment of closing of the machine, i.e. as soon as the two halves of the die come into contact, the check valve closes and the pressure of liquid in the closing cylinder rises to the working pressure, i.e. to 120 atm. (1700 psi). The machine is closed by the mean force. This arrangement reduces the consumption of pressure liquid to a minimum.

The intensifier

raises the pressure of the liquid in the closing cylinder to 320 atm. (4550 psi) and thus develops the full closing force of the machine of 500 tons.

The pressure cylinder

is fitted to the pressure stirrup of the machine and is made of cast steel. It is provided with a pressing force reducer and de-aerating valves.

The pressure plunger

is made of steel and ground. To the pressure plunger the injection piston is fitted by means of an extension. It is easy to replace.

The pressure stirrup

is made of cast steel and consists of two parts. One part of big dimensions, with lugs for the two columns, is the carrying part and transmits the full closing force. To this part the pressure stirrup proper is fitted in such a way that its position can be adjusted vertically. That permits castings with a side inlet to be always placed in the die in a position in which there can be no lateral gaping, so that the danger of metal spraying from the parting line is avoided.

The cold pressure chamber

is fitted in the pressure stirrup. It consists of the filling box, which is provided with channels for water cooling, the cylinder and the gate. Its bottom is formed by the counter piston which has an up-and-down movement and is hydraulically operated. The cylinder and gate are made of special alloy steel to withstand the high thermal and mechanical stresses.

The two sturdy horizontal columns

join the closing cylinder to the pressure stirrup. They transmit the full closing force and also serve as a guide for the die carrier. They are placed transversally above each other so that the die is easily accessible from all sides.

The die carrier

is made of cast steel. In case of high dies it is bolted directly to the closing piston. In case of lower dies a spacer block is fitted between the closing piston and the die carrier. The carrier is provided with exchangeable bushes of generous dimensions by means of which it is guided into the columns.

The hand distributor

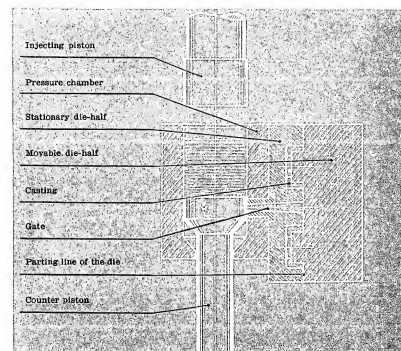
fitted to the pressure stirrup at a convenient height controls the various movements of the machine.

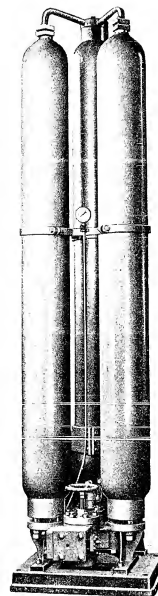
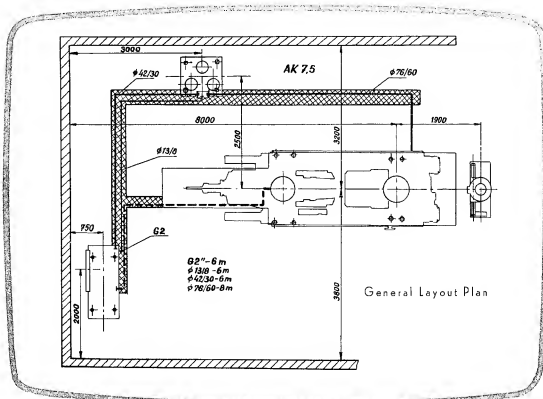
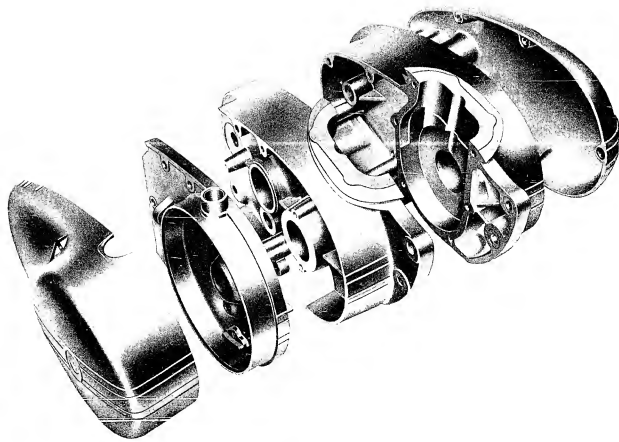
The fixed half of the die

is attached to the pressure stirrup. It is provided on its seating surface with a recess for the head of the gate.

The moving half of the die

is attached to the die carrier by means of the clamping box.



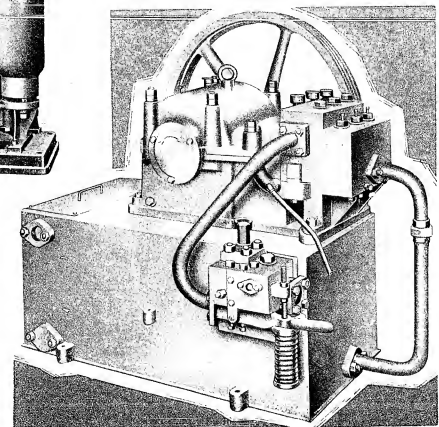


The accumulator

is a three-bottle hydro-pneumatic unit with a total capacity of 750 litres (165 gals). It ensures the immediate availability of the requisite quantity of pressure liquid and affords an easy control of the closing and injection piston speeds independent of the pump.

The pump

is a high speed unit with horizontal pistons, of simple design, absolutely reliable in operation. It is driven by an electric motor and stops and starts automatically in accordance with the permissible rise or drop of pressure in the accumulator.



The machine, pump and accumulator form the pressure diecasting equipment. Since each of these units forms an independent assembly a central pressure piping can be set up when a fairly large number of machines is being installed.

We supply

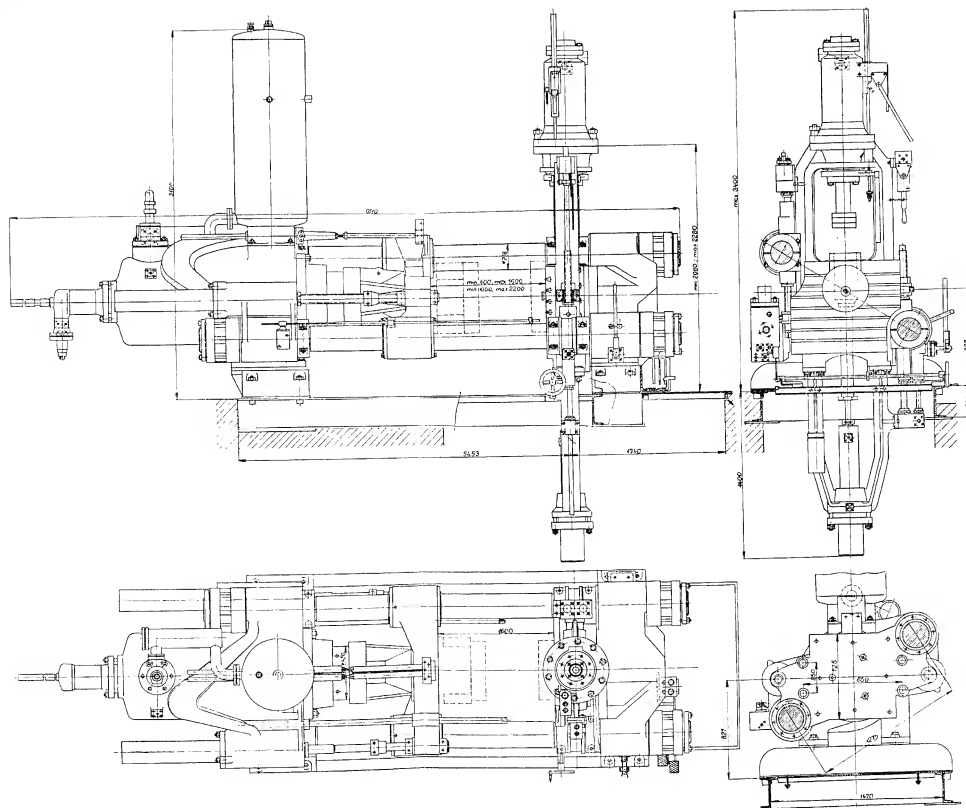
Hydraulic core-pullers
Hydraulic ejectors
Working and melting
furnaces, gas or oil fired.

We manufacture dies for
diecasting of metals.

We prepare plans for pressure
diecasting plants of all sizes.

We offer our advice on all
problems concerning this
branch.

Our products are continuously
being improved upon. The description, illustrations and particulars can therefore not always accurately agree with the latest design of machine and consequently are not binding.



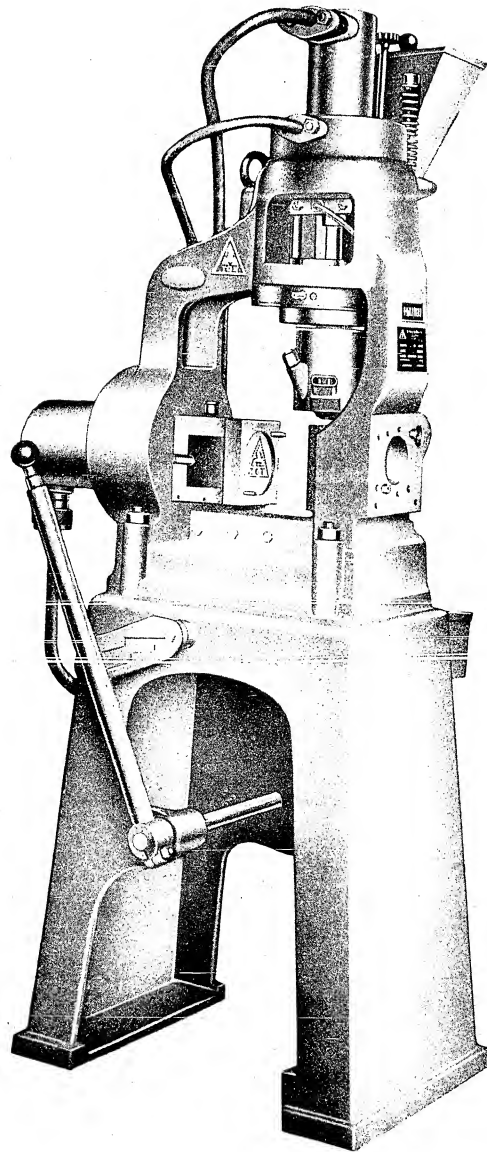
HYDRAULIC PLASTIC

INJECTION MOULDING PRESS

MODEL

STAT

1 2 4 5



HYDRAULIC PLASTIC INJECTION MOULDING PRESS

Model LTr 1245

This machine is intended for the manufacture of small and medium-size pressings of thermoplastic materials by applying the injection moulding process. It is capable of working up polystyrenes, polyamides, acetates and other thermoplastics.

Description of the machine: The press is of the angular design derived from the well proven principle of the pressure die-casting machines. The die closing is horizontal and the injection vertical into the parting-line of the die. The material is molten electrically in the heating chamber where the temperature is maintained at the required degree by a thermostat. The material is charged automatically from the hopper into the heating chamber at each stroke, the charging action being easily adjustable. The die closing is highly economical by low-pressure liquid. The high pressure is used only for keeping the die closed with great force and for the powerful movement of the injection plunger. The throat of the heating chamber and the die are water-cooled.

The frame is made of cast steel, is totally enclosed, and rests on a cast iron base. It contains the closing cylinder, injection cylinder and heating chamber and carries the hopper with the feeding device. The frame is arranged to permit the clamping of the stationary die, the ejectors and the automatic attachment for pulling thread cores from the stationary and movable die-halves.

The closing piston moves horizontally within the cylinder located in the left-hand part of the frame. It is provided with a head to which the movable die is clamped.

The injection piston moves vertically in the injection cylinder situated in the upper part of the frame. It incorporates a hardened, interchangeable plunger, passing into the heating chamber. The automatic feeding device is driven off the injection piston.

The heating chamber is electrically heated. It is arranged so that it also will handle crushed scrap material and ensure its thorough and uniform heating. The heating chamber is easily interchangeable.

The control is effected by a four-valve distributor actuated by a single lever. The distributor is arranged to prevent the injection of material before the die is closed. It also embodies a valve for the speed regulation of the injection piston.

The thermal regulating equipment consists of a thermostat of a regulator with switch incorporated in a special box.

Drive. The machine is driven by a two-pressure hydraulic Power Unit Model RP 1. The bigger hydraulic Power Unit Model RP 6 is suitable for driving as many as 5 machines.

Standard equipment: Heating chamber, thermal regulating equipment, 3 sets of spare packings, 1 set of service spanners, 1 operating instruction booklet.

Optional equipment: Additional heating chambers, injection plunger with bushings dia. 45, 35, 30, 25 mm (for different pressures in the pressed material). Dies can also be made according to drawings and samples sent.

The power unit and the connecting pipes between the power unit and the press should be ordered with the machine. — Please specify in your order current characteristics for electric motors and heating.

SPECIFICATIONS:

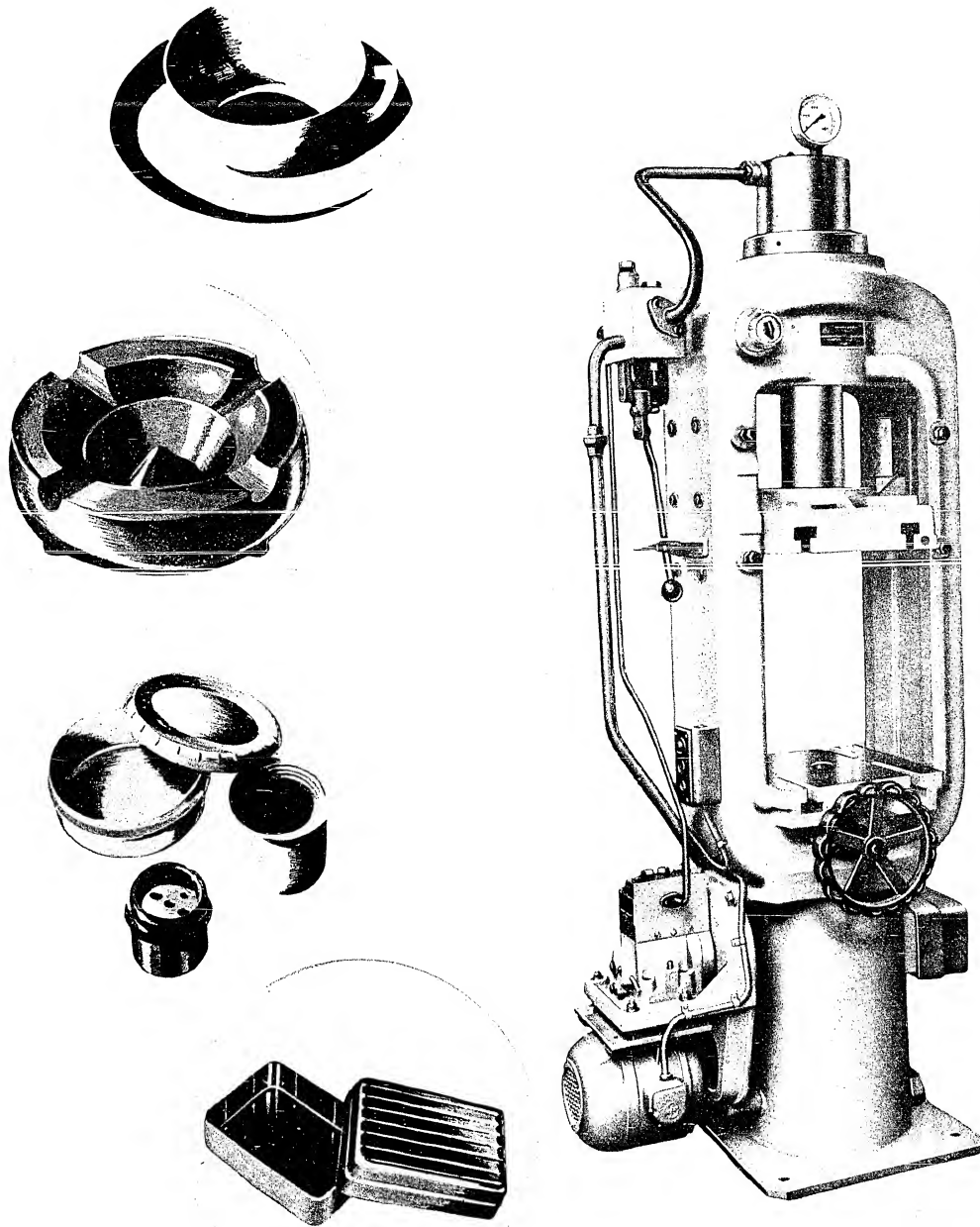
		Metric:	English:
Quantity of material injected per shot	grams	35	1.2 oz.
Number of shots per hour (dependent on the kind of product)		180—300	180—300
Maximum weight of molten material per hour	kg	3.5	7.7 lbs.
Maximum dimensions of dies (vertical X horizontal)	mm	130 X 120	5.1" X 4 7/10"
Height of stationary die	mm	35	1.4"
Maximum pressing area in parting-plane of die (for Polystyrene)	cm ²	42	6.5 sq. in.
Normal specific pressure in material	kg/cm ²	360	5100 lbs./sq./in.
Normal diameter of injection plunger	mm	40	1.6"
Other available pressures in material	kg/cm ²	280, 470, 640, 900	4000, 6700, 9100, 13000 lbs./sq./in.
Additional diameters of injection plungers (optional equipment)	mm	45, 35, 30, 25	1.8", 1.4", 1.2", 1"
Maximum power consumption for the heating chamber	kW	1.2	1.2
Die closing power	tons	12	26,400 lbs.
Injection pressure	tons	4.5	9,900 lbs.
Stroke of closing piston	mm	130	5.1"
Stroke of injection plunger	mm	78	3.1"
Maximum daylight opening of closing piston	mm	230	9.1"
Maximum working pressure	atm.	150/10	2130 lbs./sq./in.
Weight of machine	kg	480	9.5 cwt
Overall dimensions of machine (length X width X height)	cm	85 X 70 X 165	2'10" X 2'4" X 5'5"
Weight of machine with seaworthy packing	kg	625	12 cwt
Contents boxed	m ³	1.7	60 cu. feet

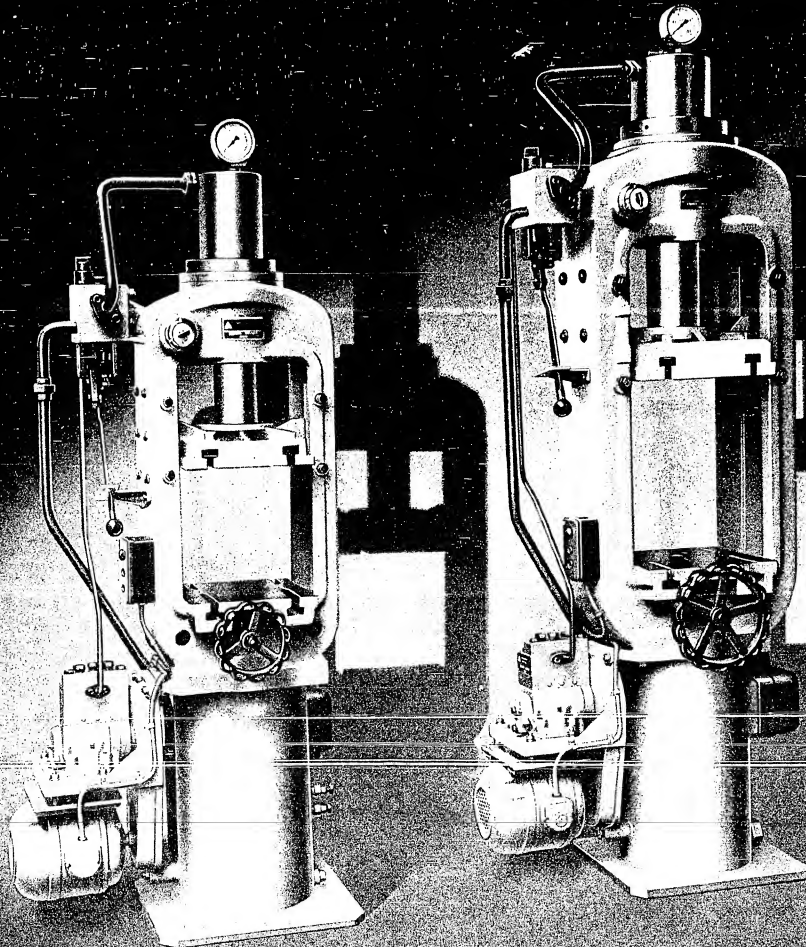
In ordering, specify voltage, phase and frequency of power supply!

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA - CZECHOSLOVAKIA

HYDRAULIC BAKELITE MOULDING PRESSES MODELS LRB 30 AND LRB 45





The Hydraulic Presses series LRB are our smallest presses for moulding hardenable plastics, such as bakelite, carbamide and melamine, but also rubber etc., in heated moulds.

The machine is of vertical design, with overhead pressure, and is powered by an individually motor-driven pump with electric motor. The rapid closing of the mould is effected by low-pressure oil while the moulding operation proper is done by high-pressure oil supplied by a plunger pump. The press is equipped with a mechanical bottom ejector. The operation of the machine is very simple by a single lever.



GENERAL DESCRIPTION

THE FRAME

of the press which is made of grey cast iron, is heavily dimensioned and of especially rigid construction. At the top is a cast steel hydraulic cylinder. The lateral parts of the frame carry adjustable prismatic guides for the upper clamp platen. The base of the frame contains the low-pressure accumulator on the left-hand side of which is located the pump, and on a swivelling bracket the electric motor. This swivel feature enables an easy belt tension adjustment.

THE PRESSING PISTON

moves in a hydraulic cylinder, is accurately ground and carries the clamp platen provided with slots on its lower surface for clamping the upper mould half. In the centre of the table is a hole for the ejector.

THE EJECTION

is done mechanically from below by means of a handwheel, pinion, and geared ejector.

THE OPERATION OF THE PRESS

is effected by a two-valve distributor located on the left-hand side of the machine and controlled by a single hand lever. On the distributor a regulating safety valve is mounted by which the working pressure of the oil supplied by the pump may be adjusted as required. Starting and stopping of the motor is accomplished by two push buttons. As soon as - after opening the mould - the clamp platen reaches its top position, the motor is stopped automatically by a limit switch. In case of overload it is cut-out by the fuse of the protective contactor. For checking up the pressing time the machine is provided with a short-termed signal clock.

THE DRIVE

is by a three-piston pump powered by a motor through V-belts. The pump sucks oil from the low-pressure accumulator where the oil is held under pressure of 4-5 atm. The low-pressure oil directly from the accumulator is used for rapid closing of the mould, while the high-pressure oil supplied by the pump is used for the moulding proper and for opening the mould. Thus 50-70 per cent of the driving power are saved.

STANDARD EQUIPMENT

Pump with pulleys and V-belts, electric motor with protective contactor, pressure gauge, 1 set of spanners, 3 sets of spare packings, 1 operator's instruction booklet.

OPTIONAL EQUIPMENT (only on special order and at an extra charge)

Control panel with devices for automatic regulation of the mould temperature (1 double mercury relay, 2 thermostats), compressor with blow gun.

On special order we supply moulds according to drawings or samples sent.

SPECIFICATIONS

		Metric		English	
		LRB 30	LRB 45	LRB 30	LRB 45
Maximum pressing power	tons	30	45	tons 30	45
Maximum return power	tons	5	6,5	tons 5	6,5
Maximum platen distance	mm	450	650	in. 18	25,5
Minimum platen distance	mm	250	400	in. 9,8	15,7
Stroke of piston	mm	200	250	in. 7,9	9,8
Dimensions of clamp platens	mm	360×310	400×360	in. 14,2×12,2	15,75×14,2
Distance between columns	mm	325	385	in. 12,8	15,2
Stroke of ejector	mm	140	150	in. 5,5	5,9
Maximum working pressure	atm	320	320	lbs/sq. in. 4550	4550
Pressure in low-pressure accumu- lator	atm	5	5	lbs/sq. in. 71 8	71 8
Quantity of operating oil	litres	20	20	gals. 4,4	4,4
Output of motor	kW	1,1	1,1	kW 1,1	1,1
Dimensions of machine	cm	92×51×191	92×70×222	in. 36×20×75	36×27,5×87
Net weight of machine	kg	620	960	lbs 1370	2120
Weight of machine with seaworthy packing	kg	760	1035	lbs 1680	2285
Contents boxed	m ³	1,5	1,8	cuft 53	64
Dimensions of seaworthy packing	cm	100×70×205	100×90×235	in. 39×27,5×81	39×35×93

OPERATING LIQUID:

Non-foaming oil with a viscosity of 3,5° E at 50°C, preferably SHELL VOLTOL OIL II should be used.

In ordering, specify voltage, phase and frequency of power supply!

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

KOVO

VÁCLAVSKÉ NÁM. 56, PRAHA II. • CZECHOSLOVAKIA

STROJEXPORT - PRAHA - CZECHOSLOVAKIA

Model	LEP ₁₀	LEP ₂₀	LEP ₃₀	LEP	LEP	LEP	LEP	LEP
Pressure (rank, 30° above lower dead point)	12.5	16	25	40	25/20	40/250	40/250	LEP
Aere sheared (for tensile strength, 40 kg/mm ²)	0.45	0.61	0.95	1.54	0.95	1.54	2.4	80/315
Max. thickness at max. cutting pressure	ins	ins	ins	ins	ins	ins	ins	80
Distance between cable and ram ^a	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^b	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^c	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^d	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^e	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^f	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^g	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^h	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ⁱ	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^j	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^k	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^l	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^m	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ⁿ	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^o	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^p	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^q	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^r	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^s	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^t	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^u	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^v	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^w	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^x	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^y	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^z	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{aa}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ab}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ac}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ad}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ae}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{af}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ag}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ah}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ai}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{aj}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ak}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{al}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{am}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{an}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ao}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ap}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{aq}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ar}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{as}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{at}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{au}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{av}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{aw}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ax}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{ay}	ins	ins	ins	ins	ins	ins	ins	100
Distance between cable and ram ^{az}	ins	ins	ins	ins	ins	ins	ins	100

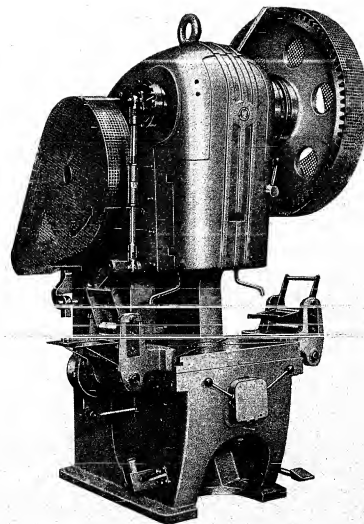
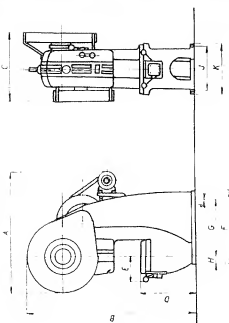
[†]) Measured without clamping plate.

MAIN DIMENSIONS OF PRESSES

[illegible]

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

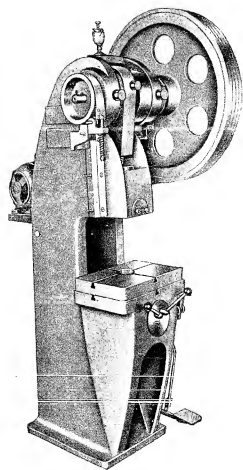


← Eccentric Press Model LEP 63/280

STRAIGHT-SIDED DEEP THROATED ECCENTRIC PRESSES SERIES

LEP

These machines are made in two types, as High-Speed Presses marked with the index "a" with a cutting pressure of 12.5, 16, 25 and 40 tons, and as Slow-Speed Presses with a geared transmission and a cutting pressure of 25, 40 and 63 tons.



STRAIGHT-SIDED DEEP THROATED ECCENTRIC PRESSES SERIES LEP

← Eccentric Press Model LEP 12,5/140a

An outstanding feature of these presses is that they can be equipped with a single roll feed, double roll feed, and gripper feed attachments or with a turntable to suit the job requirements. The press frame is of particularly rigid construction to meet all demands for accuracy when using progressive station multiple dies or complex punching dies.

The eccentric shaft is accurately mounted in heavily dimensioned bearings and has an eccentric bush for changing the stroke.

The stroke is easily adjusted and the required rate of stroke may be secured. A reliable rolling key clutch with a device for preventing the repetition of strokes is arranged both for single strokes and for continuous operation by depressing a foot-treadle.

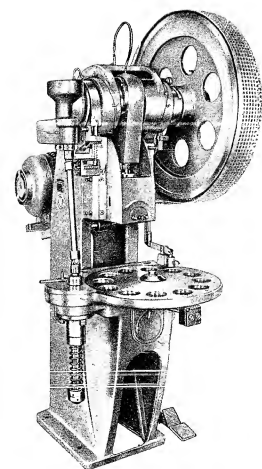
The machine is adjusted for both alternatives by shifting a lever.

The clutch of the press is actuated either by a two-hand protective device or by a foot treadle without the protective device.

Particular care and attention has been paid to the workmanship, selection and heat treatment of materials, which results in a longer life and enduring accuracy of the press.

Before leaving the works every machine is tested for accuracy in accordance with the rules valid for presses.

If not otherwise ordered, the machines are equipped normally with a motor drive to suit 220/380 volts current supply.



Eccentric Press Model LEP 12,5/140a with turntable →

STANDARD EQUIPMENT

Top ejectors for removing the pressings from the upper die-half, clamping plate, two-hand protective device, V-belts, motor V-belt pulley, motor bracket, gear transmission guard, motor for 380/220 volts, central lubrication system is provided for periodical oiling, set of spanners, operating instruction booklet.

OPTIONAL EQUIPMENT

supplied on special order and at an extra charge:

Hardened and ground steel insert into the die holder when using small tools and for punching operations without waste, spring or air-operated downholders for drawing operations. Downholders of suitable design and size will be recommended in the offer. Stroke counters for recording the number of strokes and pressings produced.

Electrical Equipment:

Contactors, switches, electromagnetic starter and spot light.

SPECIFICATIONS

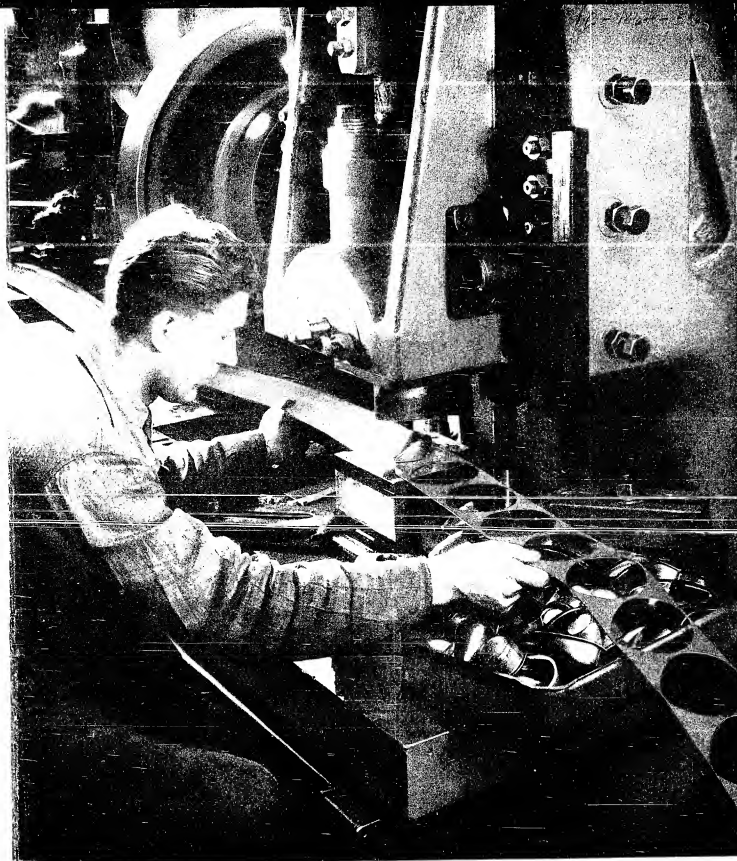
MODEL	STATIONARY BED MACHINES							ADJUSTABLE BED MACHINES			
	HIGH-SPEED PRESSES		SLOW-SPEED PRESSES					HIGH-SPEED PRESSES		SLOW-SPEED PRESSES	
	LS 20 180	LS 20 780	LP 20 180	LP 30 280	LP 100 370	LP 120 370	LP 250 400	LSu 20 180	LSu 20 780	LPu 20 180	LPu 20 780
Cutting capacity (kg)	11 000	110 000	11 000	110 000	220 000	220 000	220 000	11 000	110 000	11 000	110 000
Force (kg)	20 000	20 000	20 000	20 000	100 000	100 000	100 000	20 000	20 000	20 000	20 000
Stroke (mm)	25	11.2	2.2	1.5	250	250	250	25	25	25	25
Area (mm ²) (kg per sq. cm)	20	1.3	0.2	0.2	200	200	200	20	20	20	20
Plate thickness (mm)	0.15	0.25	0.2	0.36	0.18	0.39	0.18	0.16	0.2	0.2	0.2
Distance of table to tool (mm)	12	17.6	15	12.6	11.4	16	16	12	17.6	12	17.6
Adjustment of tool (mm)	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3	0.4-0.3
Adjustment of arm (mm)	1.6	2	4	4	4	4	4	1.6	2	4	4
Dimensions of table (mm)	1042x124	2042x174	1042x124	2042x174	2042x174	2042x174	2042x174	1042x124	2042x174	1042x124	2042x174
Distance of clamping table (mm)	1.3	6.5	1.8	6.6	11.2	11.2	11.2	1.3	6.5	1.8	6.6
For angle in work (mm)	128x24	128x24	128x24	128x24	128x24	128x24	128x24	128x24	128x24	128x24	128x24
Bottom plate (mm)	22	22	22	22	22	22	22	22	22	22	22
Flywheel (mm)	85	160	85	160	200	200	200	85	160	85	160
Speed of flywheel (RPM)	800/100	160/117	800/100	160/117	160/117	160/117	160/117	800/100	160/117	800/100	160/117
Position of table (mm)	128	128	128	128	128	128	128	128	128	128	128
Force required for driving (kg)	1.3	1.7	1.2	1.2	1.2	1.2	1.2	1.3	1.7	1.2	1.2
Speed of table (mm)	910	910	1 120	1 120	1 120	1 120	1 120	910	910	1 120	1 120
Maximum distance table to arm (mm)	128	128	128	128	128	128	128	128	128	128	128
Maximum distance table to arm (mm)	128	128	128	128	128	128	128	128	128	128	128
Distance of table to arm (mm)	128	128	128	128	128	128	128	128	128	128	128
Maximum distance table to arm (mm)	128	128	128	128	128	128	128	128	128	128	128
Weight (kg)	2 240	5 110	2 160	2 300	10 100	10 100	10 100	2 240	5 110	2 160	2 300
Weight (kg)	1 180	2 160	1 180	1 180	2 600	2 600	2 600	1 180	2 160	1 180	2 160
Weight (kg)	1 180	2 160	1 180	1 180	2 600	2 600	2 600	1 180	2 160	1 180	2 160
Dimensions (mm)	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174
Dimensions (mm)	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174
Dimensions (mm)	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174	2042x174

* Measured without helix plate. ** When applying the automatic straightening device the plate expands in width accordingly.

WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

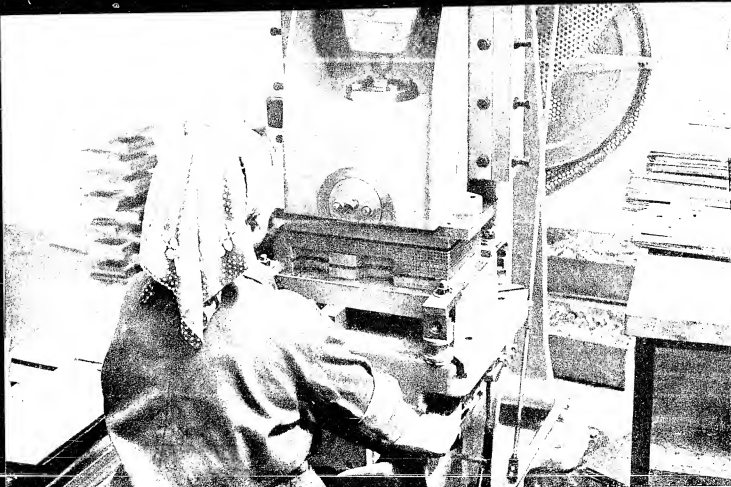
As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA — CZECHOSLOVAKIA



GAP-FRAME ECCENTRIC PRESSES

The machines which are described in the catalogue, are especially well-suited for heavy shearing and punching operations as well as for light profiling work. Their outstanding features are: simple but ingenious design, high efficiency, exceptional rigidity and versatility.



THE GAP - FRAME ECCENTRIC PRESSES

of 44,000 to 550,000 lb. cutting pressure are supplied in four sizes:

- LS High-speed Eccentric Presses.
- LP Slow-speed Eccentric Presses with Geared Countershaft.
- LSa High-speed Presses with Adjustable Bed.
- LPa Slow-speed Presses with Adjustable Bed.

The machines have an extremely rigid frame to ensure full utilization of their capacity and accuracy of products to close limits according to the generally valid conditions. The high and permanent accuracy of our machines has been obtained by ingenious design, carefully selected materials and high-grade workmanship of all machine parts. All ratings in the data sheet are based on the shearing strength of the material to be cut $k=25$ T per sq. in. The areas sheared given in the data sheet refer only to tools with a straight edge. The nominal capacity of the machine is obtained with the position of the crankshaft 30 deg. above the bottom dead point.

If the machine starts to operate before reaching this position as, for instance, in drawing, the cutting pressure should be reduced to prevent the torque from being exceeded. The area sheared F and the cutting pressure P can be determined from the formulae:

$$F = O \times L$$

$$P = F \times k$$

where "O" is the circumference of the hole to be punched in mm, "L" the plate thickness in mm and "k" the shearing strength of the material in kg per sq. mm. All cutting pressures and stock thicknesses stated in the data sheet are maximum values which should not be exceeded. When cutting thin plates the punch should be properly adapted by bevelling its cutting edge to facilitate the shearing operation which, if performed with a straight punch, would require a pressure higher than the machine is capable to withstand. Nor should the allowable work, which is equal to the product of the maximum cutting pressure and of the maximum plate thickness given in the data sheet, be exceeded.

Example: A hole of 1.28 in. in diameter is to be punched in a plate 0.2 in. thick and 25 T per sq. in. tensile. The size of the press to be employed is determined from the area sheared $F=1.28 \times 0.2=0.275$ sq. in. Thus the cutting pressure $P=0.275 \times 25=19.375$ Tons. With respect to the plate thickness the suitable machine will be the Type LP 20 with a cutting pressure of 19 Tons 840 lb. As the data sheet refers to shearing operations only, the depth of draw — when using the machine for drawing — should not exceed 45 per cent of the machine stroke. Otherwise the press would not prove sufficient in several respects: the motor would be too weak, the fly-wheel too light and the belt would slip.

AUTOMATIC STRIP-FEED ATTACHMENTS

Model	Width of strip up to in (mm)	Thickness of strip up to in (mm)	Feed range in in (mm)	Height of strip above table in (mm)
VP-I	4 (100)	0.06 (1.5)	0-4 (0-100)	2.4 (60)
VP-II	6 (150)	0.06 (1.5)	0-6 (0-150)	3.9 (100)
KP-21	4.4 (110)	0.03 (0.7)	0-4 (0-100)	2.4 (60)
KP-22	8.4 (210)	0.03 (0.7)	0-8 (0-200)	3.9 (100)
SVP-IV	2 (50)	0.03 (0.7)	0-4 (0-100)	2.4 (60)
SVP-IV	6 (150)	0.03 (0.7)	0-6 (0-150)	3.9 (100)

STRIP-STRAIGHTENING DEVICES

Model	Supplied with strip-feed attachment only	Number of rolls	Width of strip in in (mm)	Max. thickness of strip in in (mm)
VA-5	KP-21	5	4.4 (110)	0.012 (0.3)
VA-7	KP-22	7	8.4 (210)	0.02 (0.5)

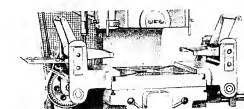
For quantity production from coiled strips the machines are equipped with a two-side gripper-feed or roll-feed attachment, or with a one-side double roll feed attachment. These attachments are supplied in two sizes for 20 ton and 50 ton machines.

On special order one-side roll-feed and gripper-feed attachments as well as roll-feed attachments with adjustable height of strip above the bolster plate and attachments for longer presses can be supplied. The double roll-feed and gripper-feed attachments are recommended to be employed in conjunction with strip straightening rolls to remove links, etc. from the coils. The straightening rolls are available with 5 or 7 rolls and can be used for thinner plates only.

VA 5 for devices KP-21 and SVP-II up to a maximum plate thickness of 0.012 in.

VA 7 for devices KP-22 and SVP-IV up to a maximum plate thickness of 0.02 in.

Automatic strip-feed attachments can easily be put out of action and the press used for single stroke operation.



Single Roll Feed Attachment

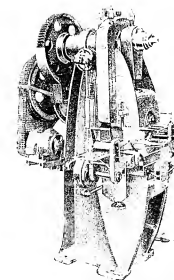


Two-side Gripper Feed Attachment

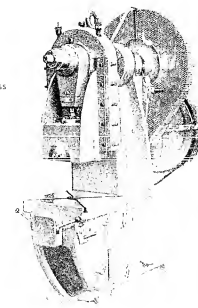


Double Roll Feed Attachment

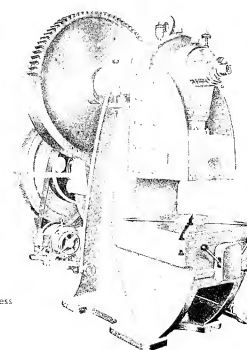
LP 20 with Adjustable Two-side Single Roll Feed attachment.

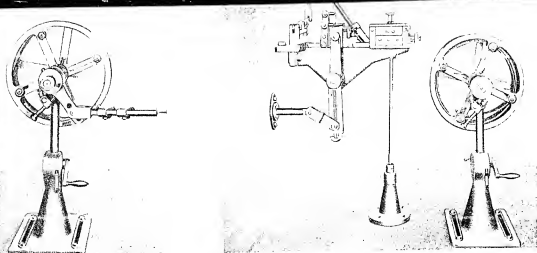


Gap-Frame Press Type LP 50



Gap-Frame Press Type LP 125





Arrangement of coil stands.



Spring-operated downholder.

Scheme of spring-operated downholder.

COIL STANDS

For presses with automatic strip-feed attachments we supply coil stands for coiling (N) and uncoiling (O) the strips. The stands are made in two sizes:

N₁, O₁ for width of strip up to 4.4 in.

N₂, O₂ for width of strip up to 8.4 in.

For inclinable presses we supply the following coil stands:

N₁N₁, O₁N₁ for width of strip up to 4.4 in.

N₂N₂, O₂N₂ for width of strip up to 8.4 in.

SPRING OPERATED DOWNHOLDERS

For drawing operations we supply air-operated or spring-operated downholders in sizes as per the specification below. The maximum pressure of the spring-operated downholders is P=6.300 lb.

D ₁	D ₂	r	t	M _{de}	D	D ₁	d	r	P lb
6.2 (155)	3.6 (90)	4.4 (110)	24 (600)	2P-1 (100)	7.2 (180)	6.4 (160)	5 (125)	2 (50)	3190 (7100)
7.2 (180)	4.4 (110)	4.8 (120)	28.8 (720)	2P-2 (200)	8.5 (210)	6 (150)	6 (150)	2 (50)	4180 (9300)
8.5 (210)	6.4 (160)	30.4 (760)	3P-3 (160)	10 (250)	9.2 (230)	6.4 (160)	3.2 (80)	3.2 (80)	6300 (14000)

AIR OPERATED DOWNHOLDERS

Air operated downholders are made for air pressure capacity of up to 10 atm.

At a lower or higher air-pressure the clamping power of the downholder is reduced or increased in the ratio of p₁ where "p" is the pressure employed.

In the table below are specified ratings for an air-pressure of 6 atm.

Max. V* P lb with 3 cylinders (kg)	Max. V* P lb with 2 cylinders (kg)	Max. V* P lb with 1 cylinder (kg)	Model	D	D	d	r	D ₁	Max** D	V	V	V	h		
200*** (515)	9000 (2000)	15 (375)	6000 (1500)	VT-180	8.3 (210)	8 (200)	7.2 (180)	6 (150)	2.52 (63)	8.4 (210)	10 (250)	5.6 (140)	5.6 (140)	5.2 (130)	8.8 (20)
210*** (535)	10830 (2400)	16 (395)	10560 (2350)	VT-224	8.8 (220)	8 (200)	6 (150)	6 (150)	2.52 (63)	10.4 (260)	12.4 (300)	5.6 (140)	5.6 (140)	5.8 (140)	9.8 (20)
220*** (565)	23100 (5150)	17 (425)	15810 (3500)	VT-280	10 (250)	10 (250)	11.2 (280)	6.4 (160)	2.88 (70)	12.8 (320)	14.4 (360)	6.4 (160)	6.4 (160)	5.6 (140)	9.8 (20)

* Measured with boxes for joining screws.

** Maximum height required with cylinder in the bottom dead point.

*** Different attaching the 3-cylinder downholders to the press the customer should ask for a detailed offer in which we shall state for which types of presses these downholders can be used.

DESCRIPTION OF MACHINES

The COLUMN

and the bed form an integral unit. The ingenious design and construction of the column and the high-grade quality of the material used reduce springing to the minimum even under the most severe working conditions.

The ECCENTRIC SHAFT

is made of forged steel.

The RAM

which is the most important machine component for obtaining precision work and increasing the life of tool, is accurately mounted. It slides in long, wide guideways which eliminate vibrations and undesirable jamming of the ram even when the heaviest cuts are being made. On machines of up to 125 tons the ram can be adjusted with regard to height by means of a ball nut and on LP 250 machines by a worm wheel. The ram is fitted with an upper ejector.

The STROKE

on all our machines can be adjusted within the limits given in the data sheet.

The CLUTCH

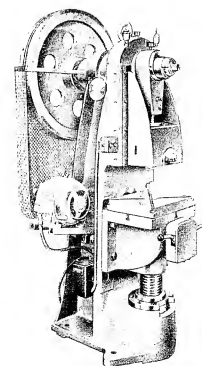
is of the rafter key type. The rafter key and the catch sleeve are of high-grade heat-treated steel. The clutch can be adjusted either for single strokes or for continuous operation. It is actuated by means of a two-hand protective device or by a foot-treadle without the protective device.

The COUNTERSHAFT

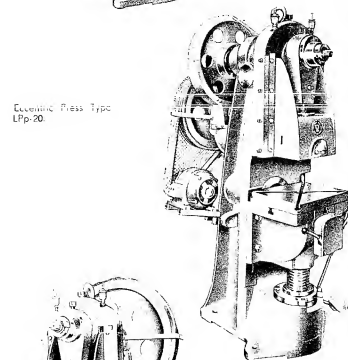
on slow-speed presses is mounted in roller bearings.

INSPECTION

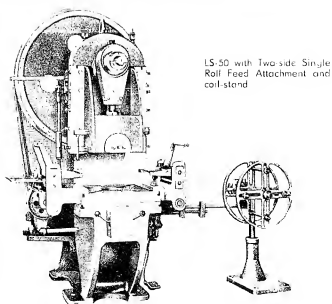
Each press has to pass a rigid inspection for capacity and accuracy under the supervision of experts. The accuracy must be within the range of standard deviations according to the regulations valid for presses.



Eccentric Press Type LSp-20



Eccentric Press Type LSp-20 with the adjustable table swung out of the way and the horn fitted in position.



LS-50 with Two-side Single Roll Feed Attachment and coil stand

SAFETY DEVICES

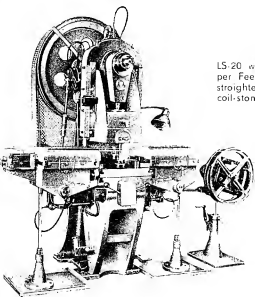
The machines are provided with a two-hand protective device to protect both hands of the operator from injury. The flywheel and the countershaft are covered with safety guards.

DRIVE

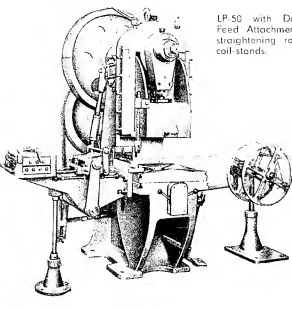
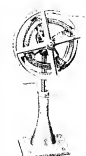
The power is transmitted from an electric motor mounted on an adjustable bracket enabling easy and correct V-belt tension adjustment. The High-speed Presses Type LS are driven by V-belts from the flywheel mounted on the main shaft. On the LP, Low-speed Presses, a geared countershaft is interposed between the flywheel and the main shaft.

LUBRICATION

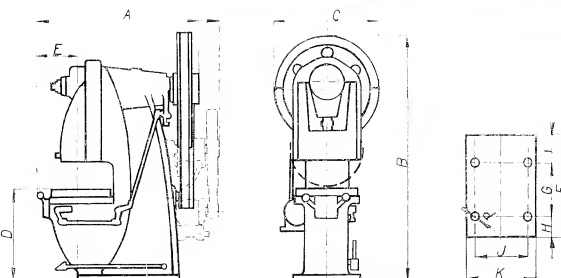
The ram guides and the ball nut have oil lubrication while the other bearings are lubricated with grease. On request the machines can be supplied with a central lubricating system.



LS-20 with Two-side Grip-feed Attachment, strip straightening rolls and coil stands



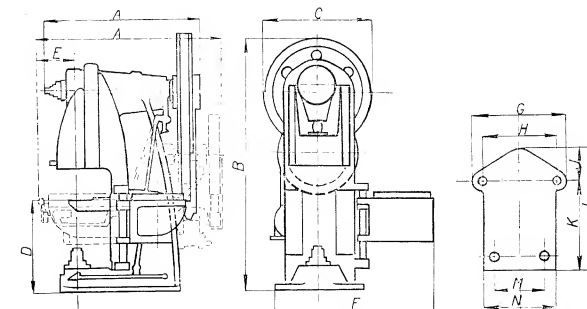
LP-50 with Double Roll Feed Attachment, strip straightening rolls and coil stands



OVERALL DIMENSIONS OF THE FOUNDATION PLAN OF PRESS WITH STATIONARY BED.

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
LP-20/83	42.8	69.7	21.8	31	10	23.2	15.8	3.8	3.6	14.4	18.8	1.03														
LS-20/183	(1071)	(1718)	(546)	(725)	(220)	(580)	(395)	(95)	(95)	(340)	(478)	(27)														
LP-50/200	51.5	80	35.8	31.6	10	23.2	15.8	3.7	3.6	14.4	18.8	1.03														
LS-50/200	(1300)	(2020)	(860)	(740)	(220)	(580)	(395)	(95)	(95)	(340)	(478)	(27)														
LP-125/315	81	81	47.6	31.6	10	23.2	15.8	3.7	3.6	14.4	18.8	1.03														
LS-125/315	(2000)	(2000)	(1170)	(740)	(220)	(580)	(395)	(95)	(95)	(340)	(478)	(27)														
LP-250/500	105.8	99	53.1	32.4	10	23.2	15.8	3.7	3.6	14.4	18.8	1.03														
LS-250/500	(2670)	(2470)	(1300)	(810)	(220)	(580)	(395)	(95)	(95)	(340)	(478)	(27)														

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
LPp-30/185	40.8	68.7	21.8	31.2	10	40	24	20	28.4	7.4	17.2	3.6	13.6	17.6	1.03											
LSp-30/185	(1071)	(1718)	(546)	(725)	(220)	(600)	(500)	(710)	(190)	(420)	(90)	(240)	(400)	(27)												
LPp-50/285	59.1	74.2	33.2	31.2	10	40	24	20	28.4	7.4	17.2	3.6	13.6	17.6	1.03											
LSp-50/285	(1500)	(1850)	(820)	(780)	(220)	(600)	(500)	(710)	(190)	(420)	(90)	(240)	(400)	(27)												
LPp-100/500	81.2	88	53.8	36.4	12.8	56.2	30.8	26	71.3	9	28	6	20	26	1.2											
LSp-100/500	(2000)	(2000)	(910)	(910)	(220)	(1400)	(770)	(650)	(1070)	(220)	(190)	(150)	(200)	(650)	(25)											
LPp-250/865	131.3	94	47.6	36.4	12.8	56.2	30.8	26	71.3	9	28	6	20	26	1.2											
LSp-250/865	(3280)	(2250)	(1190)	(910)	(220)	(1400)	(770)	(650)	(1070)	(220)	(190)	(150)	(200)	(650)	(25)											



STANDARD EQUIPMENT (Included in the price of the machine): Bolster plate, upper ejector for removing the pressing from the upper portion of the tool, a two-hand protective device, V-belts, motor pulley, an electric motor for 220, 380 volts, and 50 cycles, with bracket, connectors, switches, a set of spacers and an operator's instruction booklet. Electric motor for voltage other than stated above or special motors (with tropical insulation or protection against moisture, etc.) are supplied at an extra charge.

OPTIONAL EQUIPMENT (Supplied at extra cost): These special accessories greatly contribute to a full utilization of our machines and increase their versatility. Automatic strip-feed attachments, a steel insert into the bolster plate when using small tools or for punching operations without waste, a steel horn for adjustable bed presses, air-operated or spring-operated downholders for drawing operators (the convenient design and size of downholders will be stated in our offer), strike counters, pilot bulbs and a temperature central lubrication system.



THE GAP - FRAME ECCENTRIC PRESSES

of 44,000 to 550,000 lb. cutting pressure are supplied in four sizes:

- LS High-speed Eccentric Presses,
- LP Slow-speed Eccentric Presses with Geared Countershaft
- LSp High-speed Presses with Adjustable Bed,
- LPp Slow-speed Presses with Adjustable Bed.

The machines have an extremely rigid frame to ensure full utilization of their capacity and accuracy of products to close limits according to the generally valid conditions. The high and permanent accuracy of our machines has been attained by ingenious design, carefully selected materials and high-grade workmanship of all machine parts.

All ratings in the data sheet are based on the shearing strength of the material to be cut $k=25$ T per sq. in. The areas sheared given in the data sheet refer only to tools with a straight edge. The nominal capacity of the machine is obtained with the position of the crankshaft 30 deg. above the bottom dead point.

If the machine starts to operate before reaching this position as, for instance, in drawing, the cutting pressure should be reduced to prevent the torque from being exceeded.

The area sheared F and the cutting pressure P can be determined from the formulae:

$$F = O \times s,$$

$$P = F \times k,$$

where "O" is the circumference of the hole to be punched in mm, "s" the plate thickness in mm and "k" the shearing strength of the material in kg per sq. mm. All cutting pressures and stock thicknesses stated in the data sheet are maximum values which should not be exceeded. When cutting thin plates the punch should be properly adapted by bevelling its cutting edge to facilitate the shearing operation which, if performed with a straight punch, would require a pressure higher than the machine is capable of withstanding. Nor should the allowable work, which is equal to the product of the maximum cutting pressure and of the maximum plate thickness given in the data sheet, be exceeded.

Example: A hole of 1.28 in. in diameter is to be punched in a plate 0.2 in. thick and 25 T per sq. in. tensile. The size of the press to be employed is determined from the area sheared $F=1.28 \times \pi \times 0.2=0.775$ sq. in. Thus the cutting pressure $P=0.775 \times 25=19.375$ Tons. With respect to the plate thickness the suitable machine will be the Type LP 20 with a cutting pressure of 19 Tons 840 lb. As the data sheet refers to shearing operations only, the depth of draw — when using the machine for drawing — should not exceed 45 per cent of the machine stroke. Otherwise the press would not prove sufficient in several respects: the motor would be too weak, the fly-wheel too light and the belt would slip.

AUTOMATIC STRIP-FEED ATTACHMENTS

Model	Width of strip up to (mm)	Thickness of strip up to in (mm)	Feed ranging from to in (mm)	Height of strip above table in (mm)
VP-I	4 (100)	0.06 (1.5)	0-4 (0-100)	2.4 (60)
VP-III	8 (200)	0.06 (1.5)	0-6 (0-150)	3.2 (80)
KP-21	4.4 (110)	0.03 (2)	0-4 (0-100)	2.4 (60)
KP-22	8.4 (210)	0.03 (2)	0-6 (0-150)	3.2 (80)
SVP-II	4 (100)	0.05 (1.25)	0-6 (0-150)	2.6 (65)
SVP-IV	8 (200)	0.05 (1.25)	0-10 (0-250)	2.6 (65)

STRIP-STRAIGHTENING DEVICES

Model	Supplied with strip-feed attachment only	Number of rolls	Width of strip in in (mm)	Max. thickness of strip in in (mm)
VA-3	KP-21 SVP-II	5	4.4 (110)	0.012 (0.3)
VA-7	KP-22 SVP-V	7	8.4 (210)	0.02 (0.5)

For quantity production from coiled strips the machines are equipped with a two-side gripper-feed or roll-feed attachment, or with a one-side double roll feed attachment. These attachments are supplied in two sizes for 20 ton and 50 ton machines.

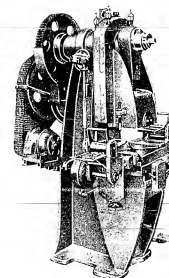
On special order one-side roll-feed and gripper-feed attachments as well as roll-feed attachments with adjustable height of strip above the bolster plate and attachments for larger presses can be supplied.

The double roll-feed and gripper-feed attachments are recommended to be employed in conjunction with strip straightening rolls to remove kinks, etc. from the coils. The straightening rolls are available with 5 or 7 rolls and can be used for thinner plates only: VA-5 for devices KP-21 and SVP-II up to a maximum plate thickness of 0.012 in.

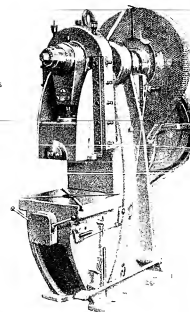
VA-7 for devices KP-22 and SVP-IV up to a maximum plate thickness of 0.02 in.

Automatic strip-feed attachments can easily be put out of action and the press used for single stroke operation.

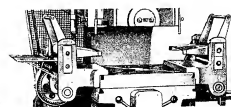
LP 20 with Adjustable Two-side Single Roll Feed attachment



Gap-Frame Press Type LP 50



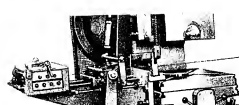
Two-side Single Roll Feed Attachment



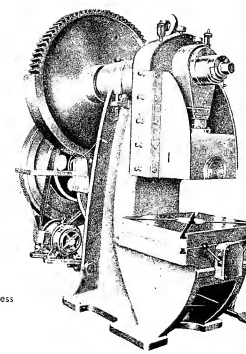
Two-side Gripper Feed Attachment

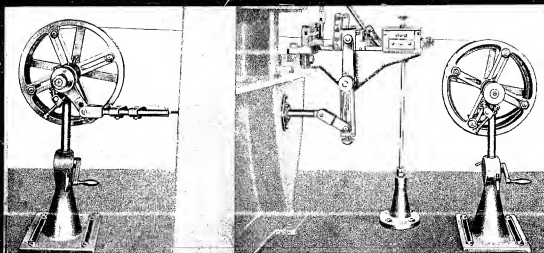


Double Roll Feed Attachment



Gap-Frame Press Type LP 125



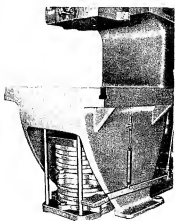


Arrangement of coil stands



Spring-operated downholder.

Scheme of spring-operated downholder.



Built-in air-operated downholder.

Scheme of air-operated downholder.

COIL STANDS

For presses with automatic strip-feed attachments we supply coil stands for coiling (N) and uncoiling (O) the strips. The stands are made in two sizes:

N_1, O_1 for width of strip up to 4.4 in.

N_2, O_2 for width of strip up to 8.4 in.

For inclinable presses we supply the following coil stands:

N_1N, O_1N for width of strip up to 4.4 in.

N_2N, O_2N for width of strip up to 8.4 in.

SPRING OPERATED DOWNHOLDERS

For drawing operations we supply air-operated or spring-operated downholders in sizes as per the specification below. The maximum pressure of the spring-operated downholders is $P=6.380$ lb.

D_1	D_2	v	t	M_{del}	D	D_1	d	z	P lb
6.8 (153)	3.5 (90)	6.4 (160)	24 (600)	2P-1	7.2 (180)	6.8 (170)	5 (125)	2	399 (1150)
7.6 (190)	4 (100)	6.8 (170)	28.8 (720)	2P-2	8.8 (220)	8 (200)	6 (150)	2	4180 (11900)
8.8 (220)	4.4 (110)	8.4 (210)	36.4 (900)	2P-3	10 (250)	8.2 (205)	8 (140)	3.2	536 (2200)

AIR-OPERATED DOWNHOLDERS

Air operated downholders are made for an air pressure capacity of up to 10 atm. At a lower or higher air-pressure the clamping power of the downholder is reduced or increased in the ratio of p_2 where " p " is the pressure employed.

In the table below are specified ratings for an air-pressure of 6 atm.

Max. V* P lb. with 3 cylinders (kg)	Max. V* P lb. with 2 cylinders (kg)	Max. V* P lb. with 1 cylinder (kg)	Model	D	D_1	D_2	d	z	D_3	Max.*** D	V_1	V_2	V_3	h
20 1/2*** 9000 (5120)	15 6000 (3375)	10 3400 (2425)	VT-180	8.8 (220)	7.2 (180)	6 (150)	5 (125)	2.52 (63)	8.4 (210)	10 (250)	5.6 (140)	5.6 (140)	5.2 (130)	0.8 (20)
21 1/2*** 15830 (3330)	16 10550 (395)	10 5200 (250)	VT-224	8.8 (220)	8 (200)	6 (150)	5 (125)	2.52 (63)	10.4 (260)	12.4 (310)	5.6 (140)	5.6 (140)	5.5 (145)	0.9 (22)
22 1/2*** 22760 (5020)	17 15840 (3505)	10 7920 (265)	VT-280	10 (250)	9.2 (230)	11.2 (280)	6.4 (160)	2.88 (72)	12.8 (320)	14.4 (360)	6.4 (160)	6.4 (160)	5.6 (140)	0.8 (20)

* Measured with bosses for joining screws.

** Maximum height required with cylinder in the bottom dead point.

*** Before attaching the 3-cylinder downholders to the press the customer should ask for a detailed offer in which we shall state for which types of presses these downholders can be used.

DESCRIPTION OF MACHINES

The COLUMN

and the bed form an integral unit. The ingenious design and construction of the column and the high-grade quality of the material used reduce springing to the minimum even under the most severe working conditions.

The ECCENTRIC SHAFT

is made of forged steel.

The RAM

which is the most important machine component for obtaining precision work and increasing the life of tool, is accurately mounted. It slides in long, wide guideways which eliminate vibrations and undesirable jamming of the ram even when the heaviest cuts are being made. On machines of up to 125 tons the ram can be adjusted with regard to height by means of a ball nut and on LP 250 machines by a worm wheel. The ram is fitted with an upper ejector.

The STROKE

on all our machines can be adjusted within the limits given in the data sheet.

The CLUTCH

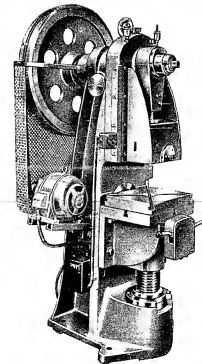
is of the rolling key type. The rolling key and the catch sleeve are of high-grade heat-treated steel. The clutch can be adjusted either for single strokes or for continuous operation. It is actuated by means of a two-hand protective device or by a foot-treadle without the protective device.

The COUNTERSHAFT

on slow-speed presses is mounted in roller bearings.

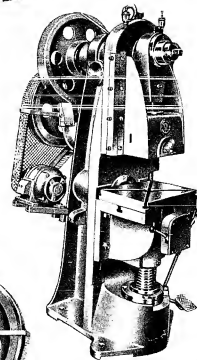
INSPECTION

Each press has to pass a rigid inspection for capacity and accuracy under the supervision of experts. The accuracy must be within the range of standard deviations according to the regulations valid for presses.

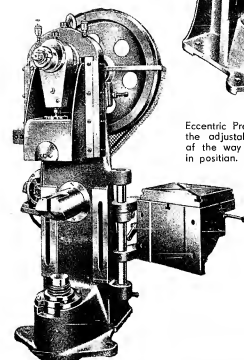


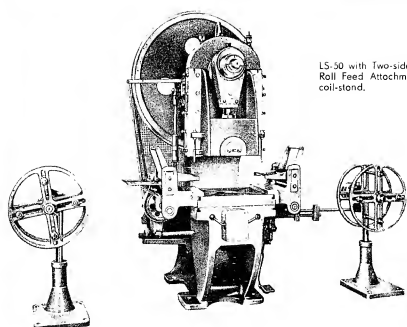
Eccentric Press Type LSp-20.

Eccentric Press Type LP-20.



Eccentric Press Type LSp-20 with the adjustable table swung out of the way and the horn fitted in position.





LS-50 with Two-side Single Roll Feed Attachment and coil-stand.

SAFETY DEVICES

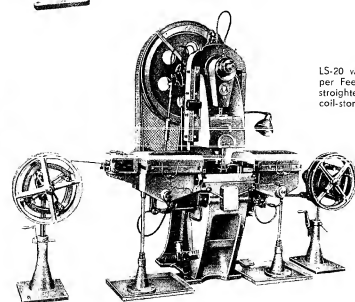
The machines are provided with a two-hand protective device to protect both hands of the operator from injury. The flywheel and the countershaft are covered with safety guards.

DRIVE

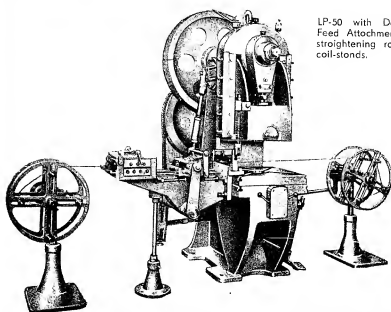
The power is transmitted from an electric motor mounted on an adjustable bracket enabling easy and correct V-belt tension adjustment. The High-speed Presses Type LS are driven by V-belts from the flywheel mounted on the main shaft. On the LP Slow-speed Presses a geared countershaft is interposed between the flywheel and the main shaft.

LUBRICATION

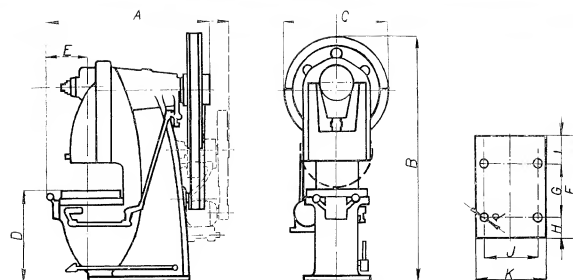
The ram guides and the bolt nut have oil lubrication while the other bearings are lubricated with grease. On request the machines can be supplied with a central lubricating system.



LS-20 with Two-side Grip-Per Feed Attachment, strip straightening rolls and coil-stands.



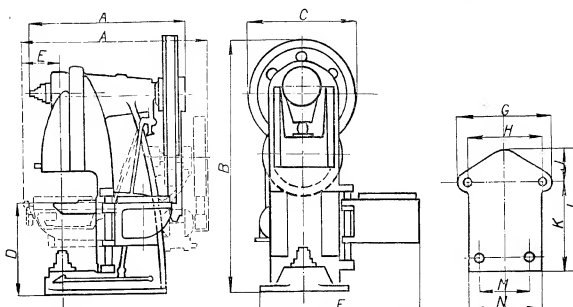
LP-50 with Double Roll Feed Attachment, strip straightening rolls and coil-stands.



OVERALL DIMENSIONS OF THE FOUNDATION PLAN OF PRESS WITH STATIONARY BED.

Model	A	B	C	D	E	F	G	H	I	J	K	L	d
LP-20/180	42.8 (1071)	68.7 (1718)	21.8 (548)	31.2 (783)	10 (254)	23.2 (588)	15.8 (399)	3.8 (95)	3.6 (90)	14.4 (362)	18.8 (473)	1.06 (27)	1.06 (27)
LS-20/180	39.1 (978)	74.2 (1860)	33.2 (833)	31 (773)	10 (254)	23.2 (588)	15.8 (399)	3.7 (92)	3.6 (90)	14.4 (362)	18.8 (473)	1.06 (27)	1.06 (27)
LP-30/280	61.2 (1530)	82 (2050)	35.8 (899)	31.6 (790)	12.8 (325)	34 (850)	22 (552)	3.6 (90)	5.4 (135)	10.2 (257)	14 (350)	1.4 (35)	1.4 (35)
LS-30/280	51.3 (1283)	81 (2020)	47.6 (1193)	31.6 (790)	12.8 (325)	34 (850)	22 (552)	3.6 (90)	5.4 (135)	10.2 (257)	14 (350)	1.4 (35)	1.4 (35)
LP-125/335	77.1 (1928)	97 (2473)	53.1 (1330)	32.4 (813)	15.2 (385)	46 (1150)	29.2 (730)	4.3 (107)	8 (200)	16 (400)	20 (500)	1.6 (40)	1.6 (40)
LP-250/420	102.8 (2570)	127.8 (3200)	54 (1330)	32.4 (813)	15.2 (385)	46 (1150)	29.2 (730)	4.3 (107)	8 (200)	16 (400)	20 (500)	1.6 (40)	1.6 (40)

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	d
LP ₂₀ /180	42.8 (1071)	68.7 (1718)	21.8 (548)	31.2 (783)	10 (254)	40 (1000)	24 (60)	20 (500)	20 (500)	78.0 (196)	17.6 (44)	17.2 (43)	13.6 (34)	14.6 (36)	1.05 (27)
LS ₂₀ /180	39.1 (978)	74.2 (1860)	33.2 (833)	31.2 (773)	10 (254)	40 (1000)	24 (60)	20 (500)	20 (500)	80.4 (201)	16.6 (42)	17.2 (43)	13.6 (34)	14.6 (36)	1.07 (27)
LP ₃₀ /280	61.2 (1530)	82 (2050)	35.8 (899)	31.6 (790)	10.8 (274)	30.8 (770)	30.8 (770)	30.8 (770)	30.8 (770)	9 (22)	9 (22)	9 (22)	9 (22)	26 (65)	1.4 (35)
LS ₃₀ /280	51.3 (1283)	81 (2020)	47.6 (1193)	31.6 (790)	12.8 (325)	56.2 (1405)	56.2 (1405)	56.2 (1405)	56.2 (1405)	10 (25)	10 (25)	10 (25)	10 (25)	65 (163)	1.4 (35)



STANDARD EQUIPMENT (Included in the price of the machine): Bolster plate, upper ejectors for removing the pressing from the upper portion of the tool, a two-hand protective device, V-belt, motor pulley, an electric motor for 220, 380 volts, and 50 cycles, with bracket, contactors, switches, a set of spacers and an operator's instruction booklet. Electric motor for voltage other than stated above or special motors (with tropical insulation or protection against moisture, etc.) are supplied at an extra charge.

OPTIONAL EQUIPMENT (Supplied at extra cost). These special accessories greatly contribute to a full utilization of our machines and increase their versatility. Automatic strip-feed attachments, a steel insert into the bolster plate when using small tools or for punching operations without waste, a steel horn for adjustable bed presses, air-operated or spring-operated downholders for drawing operations (the convenient design and size of downholders will be stated in our offer), strike counters, pilot bulbs and a foot-operated control lubrication system.

SPECIFICATIONS

MODEL	STATIONARY BED MACHINES							ADJUSTABLE BED MACHINES			
	HIGH-SPEED PRESSES		SLOW-SPEED PRESSES					HIGH-SPEED PRESSES		SLOW-SPEED PRESSES	
	LS 20/180	LS 30/280	LP 20/180	LP 30/280	LP 100/230	LP 125/335	LP 250/420	LSa 20/180	LSa 30/280	LPa 20/180	LPa 30/280
Cutting pressure	44 000	110 000	44 000	110 000	220 000	275 000	550 000	44 000	110 000	44 000	110 000
Throat	20 000	30 000	20 000	30 000	100 000	125 000	250 000	20 000	30 000	20 000	30 000
Area sheared (Ks per sq. in.)	7.2	11.2	7.2	11.2	12.8	15.2	16.8	7.2	11.2	7.2	11.2
Plate thickness	183	280	183	280	320	355	420	183	280	183	280
Distance, table to ram*	20	30	20	30	100	125	250	20	30	20	30
Adjustment of stroke	500	1 200	500	1 200	2 500	3 125	6 250	500	1 200	500	1 200
Adjustment of ram	0.16	0.22	0.2	0.36	0.48	0.58	0.64	0.16	0.2	0.2	0.36
Dimensions of table	4	5.5	5	9	12	13	16	4	5	5	9
Diameter of drop-hole in table	10	12.6	10	12.6	14.4	16	20.8	10	12.6	10	12.6
Pin hole in ram (diameter depth)	200	315	200	315	360	400	500	200	315	200	315
Booster plate (thick)	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4	0.4-0.4
Flywheel (diameter width)	1280-4	1663	1280-4	1663	263.4	263.4	263.4	1280-4	1663	1280-4	1663
Speed of flywheel	135	110	135	110	300	300	250	135	110	135	110
Power required for driving motor**	1.5	3.7	1.5	3	6	5.5	15	1.5	3.7	1.5	3
Speed of motor	940	940	1 420	1 420	1 420	1 420	1 420	940	940	1 420	1 420
Maximum distance, table to ram	14	17.2	14	17.2	320	430	350	14	17.2	14	17.2
Minimum distance, table to ram	7.2	10	7.2	10	120	250	190	7.2	10	7.2	10
Diameter of hole in frame (for steel bars)	6	7.6	6	7.6	150/7.3	190/7.3	120/7.5	6	7.6	6	7.6
Maximum distance, centre-line of bar to ram	10	14	10	14	250	350	300	10	14	10	14
Weight of machine about	2 351	5 110	2 464	5 368	10 430	12 210	30 316	2 761	7 765	3 036	8 074
Weight, packed for rail about	1 070	2 350	1 120	2 460	4 750	5 530	13 720	1 255	3 530	1 380	3 670
Weight, packed for sea about	2 503	5 592	2 618	5 720	10 860	12 610	31 670	2 761	7 765	3 036	8 074
Dimensions boxed	1 320	2 715	1 350	2 835	5 250	6 070	14 670	1 320	2 715	1 350	2 835
Contents boxed	83.36	120.09	83.36	120.09	144.81	168.1	411.5	83.36	120.09	83.36	120.09

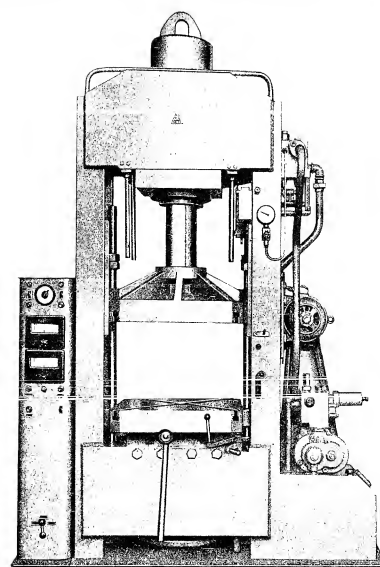
* Measured without bolster plate. - ** When applying the automatic strip-feed device the power required is increased accordingly.

WHEN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

As improvements in design are continually being made, this specification is not to be regarded as binding in detail and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA — CZECHOSLOVAKIA

STAT



TYPE

HYDRAULIC PRESS

This press is particularly suitable for the manufacture of mouldings of heat-hardening substances (thermosets), such as carbamides, melamines, phenolformaldehydes, rubber, etc. in heated moulds.



DESCRIPTION

The frame of the press is enclosed, welded of rolled sections and steel sheets. The cabinet on the left hand side of the press contains the electrical equipment.

At the right hand side the pump is arranged, fitted to the operating oil tank, as well as the electric motor driving the pump and the pressure oil distributor with the lever mechanism. In the tank the oil cleaner is fitted for removing impurities. The filter can be taken out easily without the contents of the tank being drained. The upper cast iron platen is pressed on the piston and secured by a nut locked by a screw. It is provided with a pan which catches any oil which may escape through leaks in the stuffing box. The platen is guided in adjustable prismatic guideways of soft cast iron and provided at its bottom surface with diagonal "T"-slots for clamping the upper part of the mould. The lower cast iron table is bolted to the frame of the press and has clamping slots identical with those of the upper platen. A rod for the ejection of mouldings passes through the centre of the table.

The forged moulding cylinder is built into the top part of the press.

The moulding piston is sealed by means of a collar made of oil resisting material. The head of the piston is sealed by a collar against the moulding space and the withdrawing space.

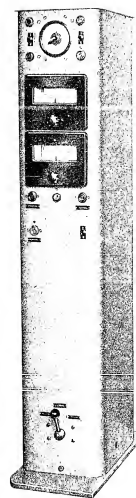
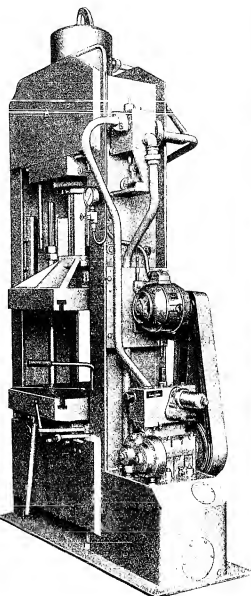
The operation of the press is controlled by a two-valve distributor. The valves are operated by a hand lever. The press cannot be started unless a safety lever is simultaneously depressed by the operator's left hand. This affords protection against injuries.

The semi-automatic operation of the press is controlled by an electromagnetic equipment with a type RZeh time relay. The time necessary for the hardening of the moulding having elapsed, this equipment changes the distributor over to withdrawal and, at the same time, starts the pump so that the press is opened. The time relay can be set within a range of 1½ to 15 minutes. The automatic opening of the press can be cut out of operation by switching off a switch, e. g. when complicated mouldings are being moulded which require cores to be removed, etc. before the mould is opened. The top position of the moulding platen can be set as required by a stop on the pull rod. The automatic opening of the press simplifies operation and permits mouldings to be produced quickly and at a uniform rate.

The press is driven by a two-stage pump.

The low pressure part is formed by a gear pump which supplies a large quantity of oil while the piston pump runs at a high speed at no load. The piston pump then increases the oil pressure to the figure required for the moulding proper. The change-over from the low pressure, which has a constant upper limit, to the high pressure and vice versa is done by a slide valve.

The high pressure is infinitely variable within a range of 50 to 100% of the maximum pressure. As soon as the pressure reaches the set figure the pump is cut out automatically and continues to run at no load.



The mouldings are ejected from the upper half of the mould by ejectors which pass through the platen as it approaches its top position. The ejection from the lower half can be done either mechanically or by hand.

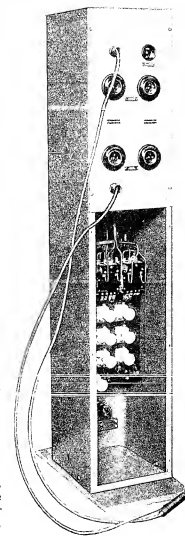
The automatic temperature control of the moulds with which the press is equipped consists of two falling stirrup type temperature regulators and an iron-constantan connection which is attached to the mould by means of terminals (thermocouples). One regulator controls the upper half of the mould, the other the lower half.

Standard Equipment

Pump with electric motor, push-button starting and thermal overload protection, pressure gauge, time relay and electromagnetic catch, automatic temperature control of moulds with falling stirrup type regulators, set of assembling tools, set of packings, operating instructions.

Special Equipment

Operating oil required for filling, further spare packings, spare parts, insulating plates under moulds, heating plates for moulds.

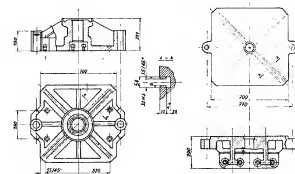


Front and Rear View of Electrical Equipment Cabinet of the Press

Dimensional Drawing of Upper Moulding Platen

Dimensional Drawing of Moulding Table

(Dimensions in millimetres)

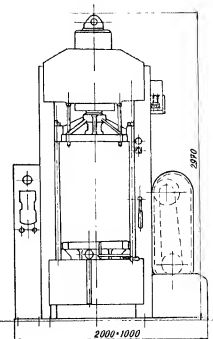


SPECIFICATION

Maximum moulding force	tons	150	150
Withdrawing force	tons	75	75
Stroke of piston	mm	400	15 1/2"
Opening	mm	800	31 1/2"
Clear width	mm	720	28 3/4"
Dimensions of table	mm	700x700	27 1/2" x 27 1/2"
Maximum force of ejection from lower half of mould	tons	30	30
Maximum stroke of lower ejector:			
automatic	mm	300	7 1/2"
by hand	mm	350	13 7/8"
Piston speeds: downward, low pressure	mm per sec.	40	1 1/2" per sec.
downward, full pressure	mm per sec.	25	1" per sec.
or double the speed at half pressure	mm per sec.	80	3 1/8" per sec.
upward, low pressure	mm per sec.	5	1/4" per sec.
upward, high pressure	mm per sec.	5	1/4" per sec.
PUMP			
Gear part:			
Pressure	atm.	15	210 psi
Capacity	litres per min.	130	20 imp. Galls. per min.
Speed	r. p. m.	920	120
Piston part:			
Maximum pressure	atm.	300	4200 psi
Capacity	litres per min.	5	1 1/2 imp. Galls. per min.
Speed	r. p. m.	920	920
Pistons: number		3	3
diameter	mm	12	1/2"
stroke	mm	30	1 1/4"
Diameter of pulley	mm	280	11"
Operating oil	litres	70	bearing oil (2.5 to 3" at 50° C)
Electric motor MEZ 450-2: power	kW	8	10 hp
speed	r. p. m.	2820	3650
4 V-belts slip	mm	15x5000	1 1/2" x 2000"
Weight of press with standard equipment	kg	3300	7500 lbs
Shipping weight of press, seaworthy packing	kg	4100	9000 lbs

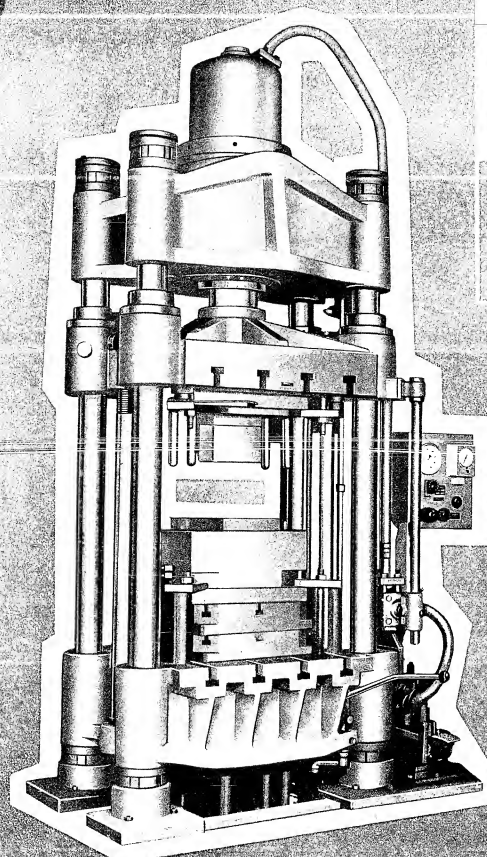
PLEASE STATE IN YOUR ORDER THE VOLTAGE
AVAILABLE FOR THE ELECTRIC MOTOR

The machines are continuously being improved upon.
The data given in this prospectus are therefore not
binding in detail.



Dimensional Drawing of the Press (Dimensions in millimetres)

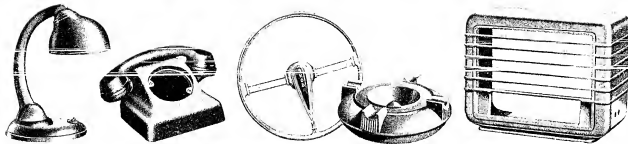
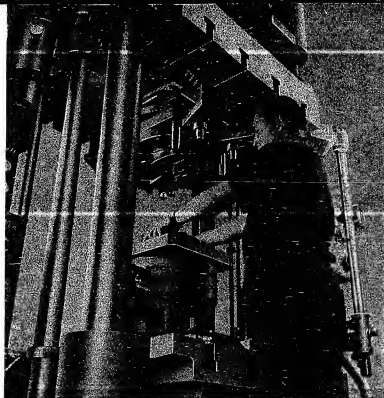
STROJEXPORT-PRAHA-CZECHOSLOVAKIA



STAT
LB 250
LB 500

**HYDRAULIC SEMI-AUTOMATIC PLASTIC MOULDING
PRESSES FOR BAKELITE MODELS LB 250 - LB 500**





HYDRAULIC SEMI-AUTOMATIC PLASTIC MOULDING PRESSES Models LB 250 and LB 500.

The machines are designed for the manufacture of large and deep mouldings of bakelite, carbamides, rubber and other materials suitable for moulding. These machines are of the four-column type with overhead pressure, bottom ejection and a device for engaging the upper ejectors. Their outstanding features are large stroke and distance between the columns. The working cycle is controlled by a single foot-lever operated distributor. The pressure is adjustable within a wide range. The speed of the clamp platen may easily be adjusted in any position. The moulding time is set by means of a time relay indirectly controlling the distributor. The machine is easily operated even by an unskilled worker.

THE WORKING TABLE

forms one unit with the lower cross-beam and is fitted with slots for clamping the lower mould half. It contains ejectors and the bottom ejecting mechanism.

THE CLAMP PLATEN

is heavily reinforced and provided with slots for clamping the upper mould half. It is guided on the columns in adjustable bronze bushed bearings.

THE CYLINDER

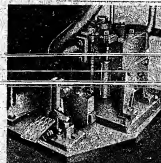
is mounted in the upper cross-beam and is accurately ground to ensure long life of the piston packings. The top ejectors may be mounted into the respective openings in the cylinder. Four columns connect the upper and lower cross-beam forming at the same time the frame of the press and the guideway of the clamp platen. The head of the piston is provided with bronze guides and with packings.

THE EJECTING MECHANISM

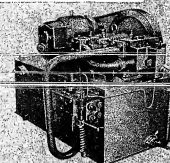
is controlled by the upper clamp platen through draw rods enabling change of stroke and disengagement. The ejectors are returned to their bottom position by means of the ejecting mechanism.

THE HYDRAULIC DOUBLE-PRESSURE POWER UNIT Model RPZ 9

is located outside the machine. Its gear pump supplies low pressure oil for the quick downward



Distributor



Power Unit RPZ 9

motion of the clamp platen. The piston pump supplies high pressure oil for the proper moulding operation. Both pumps are engaged and disengaged hydraulically and automatically.

THE CONTROL

is effected hydraulically by a distributor with 5 valves controlled by means of a single foot-lever. To enable the escape of air from the mould and to prevent any damage to the moulding at the ejection the speed of the clamp platen can be delayed. The delay may be regulated. After the working cycle has been completed the automatic opening of the press is accomplished by an automatic locking device controlled by a time relay on which the working time is set. As a result, the machine operates semi-automatically. This device may be cut out when desired.

THERMAL REGULATION.

The moulds are heated to the working temperature electrically or by other means and are automatically held at this temperature by means of thermostats and mercury relays.

STANDARD EQUIPMENT:

control panel with pressure gauge, pressure control valve and switch-off mechanism, time relay with electromagnetic locking device, set of spanners, 3 sets of spare packings, operator's instruction booklet.

OPTIONAL EQUIPMENT:

hydraulic power unit RPZ 9 with container, electric motor, starter, pulley and V-belts (should be ordered with the machine), thermal regulation devices (thermostats, mercury relays), protective motor switch (when ordering always state the kind and data of heating energy for one mould half), heat insulating plates for moulds.

SPECIFICATIONS:

	LB 250	LB 500
Maximum pressing power	250 = 550,000 lbs	500 = 1,100,000 lbs
Maximum working pressure	300 = 4,280 lbs sq. in.	400 = 5,700 lbs sq. in.
Maximum return power	125 = 275,000 lbs	210 = 464,000 lbs
Power of top ejectors	18 = 40,000 lbs	30 = 66,000 lbs
Power of bottom ejectors	63 = 140,000 lbs	100 = 220,000 lbs
Maximum platen diameter	1200 = 48"	1400 = 55"
Stroke of piston	600 = 24"	600 = 24"
Piston speed under low pressure	40 = 2.36 in./sec.	35 = 1.4 in./sec.
Piston speed under high pressure	5.2 = 0.19 in./sec.	1.3 = 0.05 in./sec.
Piston return speed under low pressure	40 = 2.36 in./sec.	35 = 1.4 in./sec.
Piston return speed under high pressure	6 = 0.24 in./sec.	3 = 0.12 in./sec.
Stroke of bottom ejectors	300 = 12"	300 = 12"
Stroke of top ejectors	300 = 12"	300 = 12"
Clamp platen dimensions	1000X1000 = 39"X39"	1000X1000 = 39"X39"
Distance between columns	1000 = 40"	1030 = 40.5"
Overall dimensions (length X width X height)	220X150X345 67"X5'X11'4"	220X150X420 73"X5'X13'10"
Net weight of machine without power unit	8330 = 184 cwt	11635 = 256 cwt
Shipping weight of machine without power unit	9440 = 186 cwt	14010 = 275 cwt
Average weight of mould	700 = 14 cwt	1200 = 24 cwt
Type LB 250 seaworthy packing, 1 case, cubic contents	10.5 = 370 cu. ft.	
Type LB 500 seaworthy packing, 6 cases altogether, cubic contents		12.8 = 450 cu. ft.

SPECIFICATIONS OF HYDRAULIC DOUBLE-PRESSURE POWER UNIT RPZ 9:

Maximum working pressure for Type LB 250	atm.	300 = 4,280 lbs sq. in.
Maximum working pressure for Type LB 500	atm.	400 = 5,700 lbs sq. in.
Working pressure of gear pump	atm.	12 = 170 lbs sq. in.
Quantity of hydraulic liquid supplied up to 300 at pressure	litres/min.	14 = 3.7 gallons/min.
Quantity of hydraulic liquid supplied up to 400 at pressure	litres/min.	17 = 4.4 gallons/min.
Quantity of hydraulic liquid supplied up to 12 at pressure	litres/min.	150 = 34.6 gallons/min.
Overall electric motor	kW	280 = 64.5 gallons
Overall dimensions (length X width X height) approx.	cm	140X70X100 55X28X40
Weight of pump	kg	620 = 12.2 cwt
Weight of pump with seaworthy packing	kg	805 = 15.8 cwt

WHEN ORDERING, ALWAYS STATE CURRENT CHARACTERISTICS OF THE MOTOR AND HEATING CURRENT FOR THE MOULDS.

	LB 250	LB 500
Maximum surface of flat bakelite moulding	cm ² approx. 1000 = 155 sq. in. approx.	2000 = 310 sq. in.
Maximum surface of carbamide moulding	cm ² 450 = 70 sq. in.	900 = 140 sq. in.
Maximum surface of deep bakelite moulding	cm ² 500 = 77 sq. in.	1000 = 155 sq. in.
Temperature of mould for bakelite	approx. 160-180 C = 320-355 F	
Temperature of mould for carbamide	approx. 140-150 C = 285-309 F	
Curing time of bakelite moulding with wall 3 mm thick	approx. min. 25-35	
Curing time of carbamide moulding with wall 3 mm thick	approx. min. 27-37	
Ratio of volume of powdered pressing material to volume of mouldings	1.5-1.6	
Specific gravity for bakelite moulding	1.5-1.6	
Specific gravity of carbamide moulding	1.5-1.6	
Units of heating current per litre of mould	approx. 36 W	

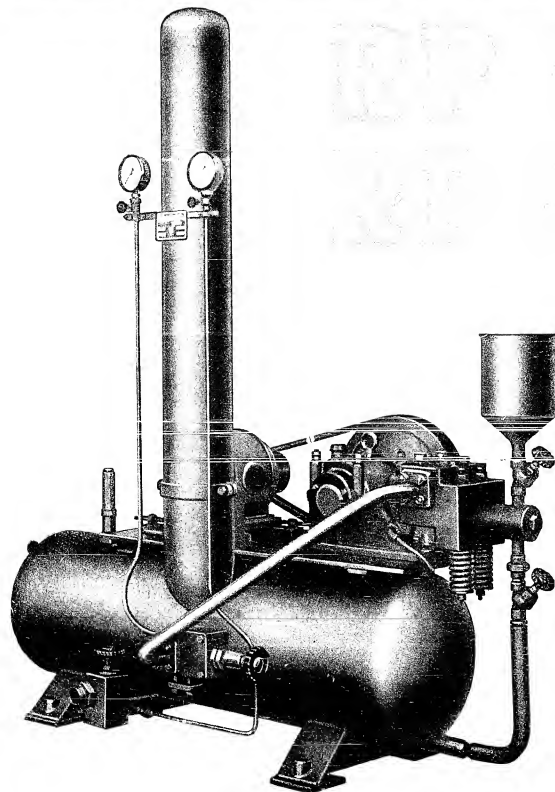
All information given regarding bakelite refer to bakelite containing 40-50 per cent of glass and wood powder filler.

IN ORDERING, SPECIFY VOLTAGE, PHASE, AND FREQUENCY OF POWER SUPPLY.

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA, CZECHOSLOVAKIA

HYDRAULIC DOUBLE PRESSURE POWER UNITS



RP 1 and RP 6 Hydraulic Double-Pressure Power Units

The RP units are used for driving various types of hydraulic presses especially the presses for the injection moulding of thermoplastics, further for driving bakelite moulding presses arranged in batteries or for driving the whole pressroom if two or more power units are combined.

The units consist of a low-pressure and a high-pressure accumulator and of a plunger pump which delivers the operating liquid to the high-pressure accumulator without interruption. Thus an immediate supply of a large quantity of driving fluid is available.

GENERAL DESCRIPTION

The low-pressure accumulator of the horizontal type is welded to the base and at the front it carries the body of the automatic shut-off minimum valve. The pump is situated at the top. A funnel for filling the vessel with operating liquid is fitted to the accumulator. An inlet valve is provided for filling the accumulator with compressed nitrogen or in case of necessity with air. The pressure in the vessel is indicated on a pressure gauge.

The high-pressure accumulator is a vertical type steel bottle which is welded to the body of the throttle valve. The throttle valve operates also as an automatic minimum valve, which does not allow the pressure in the accumulator to drop under a certain limit. The pressure in the accumulator can be checked on another pressure gauge.

The plunger pump is driven by Vee-belts from the electric motor. Both the pump and the motor are mounted on the low-pressure accumulator. The pump body is made of a steel block to eliminate porosity and leakage. The pump valves can easily be removed. The crank case of grey cast iron, with removable cover, is provided with an oil level gauge. The crankshaft which is made of special steel runs in rigid roller bearings. The cast steel connecting rods are also mounted on roller bearings. The cast iron crosshead with a steel pin is equipped with a self-adjusting bronze bush, transmitting the pressure from the connecting rod to the piston which is provided with a special packing. The pressure oil is sucked by the pump from the low-pressure accumulator and delivered into the high-pressure accumulator, where the oil under a pressure of 150 atm (2,125 lbs./sq. inch.) is ready for operation. The pump is equipped with an adjustable bar-type cut-out which automatically stops the pump, when the pre-set pressure is reached, so that the motor runs idle. Thus considerable saving of driving power is obtained.

STANDARD EQUIPMENT

Electric motor (380/220 volts, 50 cycles, if not otherwise ordered), 2 pulleys with Vee-belts, 2 pressure gauges, 1 oil strainer, 1 set of spanners, 3 sets of spare packings, 1 instruction booklet.

OPTIONAL EQUIPMENT (only on special order at an extra charge)

Connecting pipes between the power unit and the press, low-pressure and high-pressure shut-off minimum valve when several presses are connected to one power unit.

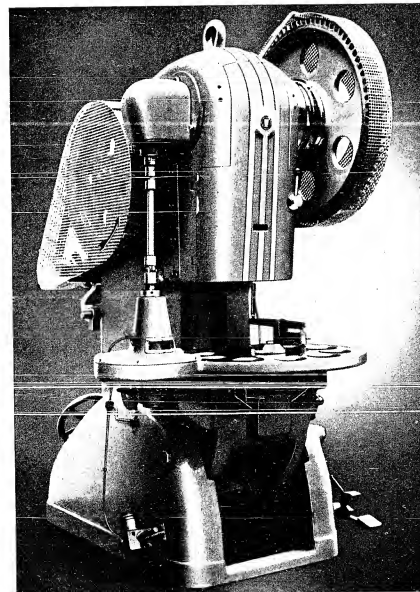
CAUTION! NEVER TRY TO FILL THE ACCUMULATOR WITH OXYGEN! DANGER OF EXPLOSION! CAUTION!

SPECIFICATIONS

	RP 1			RP 6		
Amount of liquid supplied	l/min.	2.7	0.606 gallons/min.	l/min.	15	2.7 gallons/min.
Maximum working pressure	atm	150	2,125 lbs./sq. in.	atm	150	2,125 lbs./sq. in.
Pressure of low-pressure accumulator	atm	7	100 lbs./sq. in.	atm	7	100 lbs./sq. in.
Number of pump pistons		1			1	
Output of motor	kW	1.1	1.1 kW	kW	4.5	4.5 kW
Capacity of low-pressure accumulator	l	80	17.6 gallons	l	140	36.8 gallons
Capacity of high-pressure accumulator	l	20	4.4 gallons	l	40	8.8 gallons
Net weight of power unit	kg	300	5.91 cwt	kg	680	13.4 cwt
Shipping weight of power unit	kg	330	10.45 cwt	kg	860	18.75 cwt
Dimensions of power unit	cm	155 X 80 X 125	51" X 25" X 42"	cm	215 X 90 X 120	71" X 31" X 42"
Seaworthy packing, cubic contents	cm	180 X 95 X 145	51" X 32" X 42"	cm	230 X 95 X 125	77" X 32" X 42"

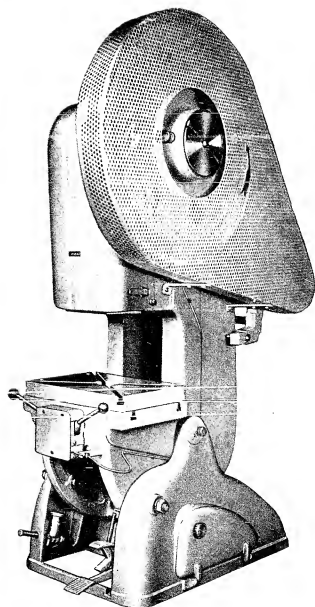
Operating liquid: A mixture of pure water with 3-5% of SHELL ANTICORROSION emulsion oil or SHELL A 11 pure oil should be used.

STROJEXPORT
PRAHA - CZECHOSLOVAKIA



INCLINABLE ECCENTRIC PRESSES SERIES

LEN



INCLINABLE ECCENTRIC PRESSES SERIES LEN

Inclined Eccentric Press Model 25/220.
On front page is shown Inclined
Eccentric Press Model LEN 63/280 with
revolving feed attachment.

These machines combine the adaptability to a wide variety of cutting and drawing operations by using spring-loaded or air-operated down-holders. They are especially well-suited for the high-speed quantity production from coiled strip material by employing automatic feeding attachments.

The machines are built in two types:

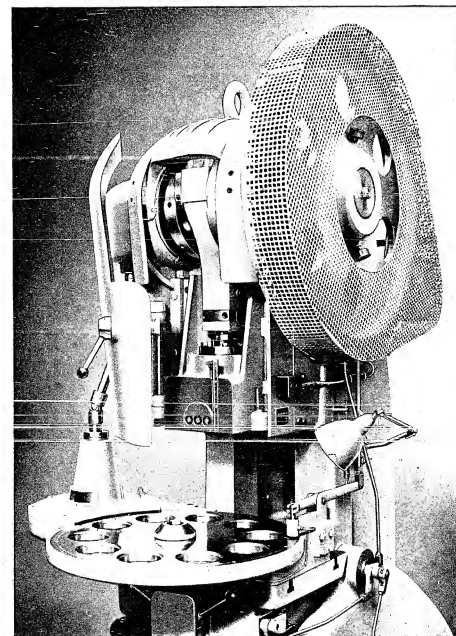
High Speed Presses with 12.5, 16, 25 and 40 tons cutting pressure,
Slow Speed Presses with 25, 40, 63, 80 and 100 tons cutting pressure.

The exceptionally sturdy construction of the frame permits the use of progressive or complex dies without any danger of damaging the machine.

The press frame can be inclined up to 30° from its vertical position, which is easily done by means of a screw spindle mechanism. The eccentric shaft is accurately mounted in heavily dimensioned bearings and carries an eccentric bush for changing the ram stroke according to the accompanying table.

A safe and reliable rolling key clutch prevents the repetition of strokes and is arranged for single strokes just as for continuous operation by depressing the foot-treadle. The adjustment for both alternatives is very easy by means of a lever. The clutch is controlled either by a two-hand protective device or by a foot-treadle without the protective device. The ram slides in long V-ways provided in the press-frame and is adjustable on the connecting rod by a ball nut made of special high-quality steel.

Particular attention has been paid to the selection and heat-treatment of material and to accurate workmanship, which results in long life of the machine and its enduring accuracy. Prior to its delivery each machine is tested for accuracy according to the rules generally valid for presses.



View of Eccentric Press Model
LEN 63/280 with open
cover.

For work from coiled strip material the presses are furnished with a two-hand gripper feed attachment in two sizes. For the gripper feed and double roll feed attachments strip straightening devices are supplied consisting of five or seven rolls for straightening strips up to the max. thickness of 0.5 mm before the strip enters the feeding attachment. It is necessary, however, first to consult the manufacturer, whether the material of a certain thickness and width can be straightened in this way!

An important feature of these presses is that, in addition to the already mentioned feeding attachments, they can be equipped with a revolving feed attachment.

STANDARD EQUIPMENT: (included in the price of the machine)

Bolster plate, two-hand protective device, V-belts, motor pulley, electric motor to suit 220/380 volts with a bracket, gear transmission, top ejectors for removing the pressing from the upper part of the machine, electrical equipment, central system of lubrication for periodic oiling, set of spanners, operating instructions.

OPTIONAL EQUIPMENT: (supplied on special order and at an extra cost)

Hardened and ground steel insert into the bolster plate when using small tools and for punching operations without waste, air-operated or spring-loaded downholders for drawing operations (the convenient design and size of the downholders will be given in our offer), stroke counters for recording the numbers of strokes and pressings produced.

STROJEXPORT - PRAHA - CZECHOSLOVAKIA

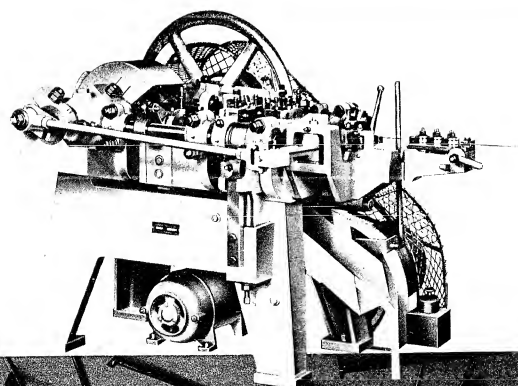
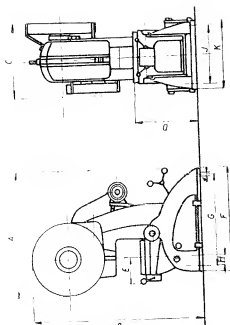
Model	LENo 12.5/140	LENg 16/160	LENg 25/220	LENg 40/250	LEN 25/220	LEN 40/250	LEN 63/280	LEn 80/315	LEn 100/320
Cutting pressure at the position of crank 30° above the horizontal point tons	12.5	16	25	40	25	40	63	80	110
Bore diameter of piston in.	0.46	0.6	0.95	1.5	0.95	1.5	2.4	3.1	3.9
Axial distance between connecting rods in.	1 ¹ / ₂	2	3	5	3	5	7	9	12
Max. pin thickness at max. cutting pressure . . up to ins	5 ¹ / ₂	6 ¹ / ₂	8 ¹ / ₂	9 ¹ / ₂	8 ¹ / ₂	9 ¹ / ₂	11	12 ¹ / ₂	12 ¹ / ₂
Throat ins	5 ¹ / ₂	6 ¹ / ₂	8 ¹ / ₂	9 ¹ / ₂	14	15 ¹ / ₂	17 ¹ / ₂	18 ¹ / ₂	19 ¹ / ₂
Distance column to ram* ins	11 ¹ / ₂	12 ¹ / ₂	15 ¹ / ₂	18 ¹ / ₂	8 ¹ / ₂	9 ¹ / ₂	11	11 ¹ / ₂	12 ¹ / ₂
Distance between columns ins	11 ¹ / ₂ /16 ¹ / ₂	12 ¹ / ₂ /18 ¹ / ₂	15 ¹ / ₂ /22 ¹ / ₂	18 ¹ / ₂ /25 ¹ / ₂	16 ¹ / ₂ /18 ¹ / ₂	18 ¹ / ₂ /20 ¹ / ₂	20 ¹ / ₂ /22 ¹ / ₂	22 ¹ / ₂ /23 ¹ / ₂	23 ¹ / ₂ /24 ¹ / ₂
Dimensions of tube (depth x width) dia. ins	11 ¹ / ₂ /16 ¹ / ₂	12 ¹ / ₂ /18 ¹ / ₂	15 ¹ / ₂ /22 ¹ / ₂	18 ¹ / ₂ /25 ¹ / ₂	8 ¹ / ₂ /11 ¹ / ₂	9 ¹ / ₂ /12 ¹ / ₂	11 ¹ / ₂ /14 ¹ / ₂	12 ¹ / ₂ /14 ¹ / ₂	13 ¹ / ₂ /15 ¹ / ₂
Thickness of bolsterplate ins	3 ¹ / ₂	4 ¹ / ₂	5 ¹ / ₂	7 ¹ / ₂	3 ¹ / ₂	4 ¹ / ₂	5 ¹ / ₂	6 ¹ / ₂	7 ¹ / ₂
Diameter of bolsterplate dia. ins	3 ¹ / ₂	4 ¹ / ₂	5 ¹ / ₂	7 ¹ / ₂	3 ¹ / ₂	4 ¹ / ₂	5 ¹ / ₂	6 ¹ / ₂	7 ¹ / ₂
Adjustment of stroke up to ins	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂
Pinhole (dia. x depth) ins	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂
Pinholes (dia. x depth) ins	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂
Pinholes (dia. x depth) ins	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂
Pinholes (dia. x depth) ins	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂	1 ¹ / ₂ /2 ¹ / ₂
Metric Output kW	1.5	2.2	3.5	6.0	3.5	6.0	9.5	12.5	16.0
Motor Speed R. p. m.	1,450	1,750	2,850	4,800	1,450	1,750	2,850	3,550	4,500
Weight of machine approx. lbs	2,200	3,200	3,900	6,550	4,200	6,400	10,800	12,300	16,400

c) Without bolster plate.

MAIN DIMENSIONS OF PRESSES:

Model	A	B	C	D	E	F	G	H	I	J	K	L
LENA	51°	76°	271°	30°	101°	381°	381°	71°	141°	191°	7°	11°
LENA	23/220	85°	331°	301°	111°	431°	371°	61°	231°	81°	11°	11°
LENA	40/250	59°	39°	331°	131°	431°	371°	71°	231°	32	91°	11°
LENA	23/220	59°	85°	331°	301°	111°	431°	371°	6°	191°	361°	91°
LENA	40/250	59°	92°	32°	301°	131°	431°	371°	71°	231°	361°	11°
LENA	63/280	79°	112°	421°	331°	141°	431°	371°	65°	521°	31°	11°
LENA	80/315	69°	112°	501°	351°	151°	73°	61°	101°	33°	111°	11°
LENA	100/350	94°	1151°	511°	36°	151°	73°	61°	71°	331°	43	121°

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!



HÖCHSTLEISTUNGS-DRAHTSTIFT-SCHNELLPRESSEN Modell

LEIA

50,70,110

LEHA 50·70·110

Der Hauptvorteil dieser Pressen besteht in ihrer hohen Leistung selbst bei langem, schwerem Dauerbetrieb, so daß sie allen zeitgemäßen Anforderungen vollauf entsprechen.

Konstruktion. Der kräftige Bau der Maschinen, ebenso wie die überaus zweckmäßige konstruktive Durchbildung aller beanspruchten Teile gewährleisten hohe Lebensdauer bei dauernder Höchstleistung. Der Maschinenkörper sowie alle übrigen Teile sind der hohen Beanspruchung entsprechend reichlich bemessen. Besonderer Wert wurde auf den Gütegrad des angewandten Materials und genaue Werkstattdurchführung gelegt. Grundsätzlich wurden Ersparnisse durch konstruktive Vervollkommenung und nicht auf Kosten der Güte und Betriebssicherheit erzielt.

Hauptantrieb. Die Steuerungsorgane befinden sich auf zwei seitlich gelagerten Hilfswellen, wodurch das Aufeinanderschnellen der Messer vermieden wird. Die Kurbelwelle ist vierfach gelagert und durch ein Gegengewicht ausgewuchtet, so daß ein gleichmäßiger Gang der Presse erzielt und ihre Lebensdauer erhöht wird. Die in langen Führungen gleitenden Messerschieber werden mittels Kurbelhebelzener angetrieben. Sämtliche Lagerstellen sind mit Bronzefuttern versehen, mit Ausnahme der Rollen, die auf Nadellagern rotieren, wodurch ein Warmlaufen vermieden und der Verschleiß auf das Mindestmaß beschränkt wird. Alle unbeweglichen Lagerstellen sind mit Zentralschmierung, nur die beweglichen Teile mit normalen Schmierbüchsen ausgestattet.

Drahteinzug. Der Antrieb des Drahteinzuges erfolgt durch eine Kulisze. Die Nagellänge wird leicht durch eine Schraube eingestellt. Der Einzugsmeißel wird während des Rücklaufs abgehoben, so daß der Draht von der scharfen Messerschneide nicht abgerieben und die Messerschneide nicht abgestumpft wird. Das Ausschalten des Drahteinzuges erfolgt durch einen Handauslöser bei laufender Maschine.

Werkzeuge. Die Werkzeuge sind leicht zugänglich und können schnell ausgewechselt werden. Der Hammerstempel ist in einem stellbaren Stempelhalter von kleinen Abmessungen befestigt und gegen Herausfallen während des Betriebes gesichert. Als Neuheit ist das Backenstück in Form eines Kästchens ausgebildet, wobei durch bloßes Verdrehen das Spannprofil 14mal erneuert werden kann, ohne das Gesenk auswechseln zu müssen. Diese Einrichtung bringt beträchtliche Zeitersparnisse mit sich.

Abstreifer. Um das Herumstreuen der fertigen Nägel außerhalb des Ausfallbleches zu vermeiden, ist die Maschine mit einem Abstreifer ausgestattet, der den abgeschnittenen Nagel nach unten auf das Ausfallblech befördert. Der Abstreifer ist unterhalb des Hammerschlittens angebracht. Ein zweiter, von oben wirkender Abstreifer dient zum Entfernen der sich etwa nach dem Stumpfwerden der Messerschneiden bildenden Abfälle.

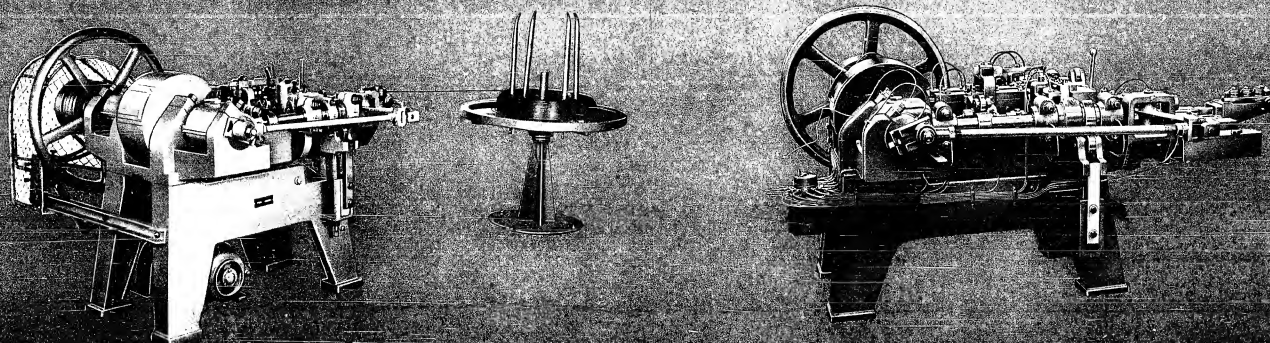
Normalzubehör: 1 Stempel,

- 1 vierzahniges Kopfgesenk,
- Messer zum Spitzenschneiden,
- Fettpresse,
- Betriebsanleitung.

Sonderzubehör: Drahtaspel.

Jeder Drahtstiftdurchmesser erfordert natürlich andere Werkzeuge. Bei Bestellung wolle man maßgebende Muster oder genaue Zeichnungen der Artikel beifügen. Zugleich machen wir aufmerksam, daß auf unseren Maschinen auch gewöhnliche Niete, u. zw. bis zu dem jeweils gegebenen Durchmesser, hergestellt werden können.

Die Maschinen werden mit fester oder loser Riemenscheibe geliefert. Auf Wunsch und gegen Mehrpreis liefern wir Maschinen für direkten Motorantrieb.



TECHNISCHE ANGABEN:

Modell	LHA 50	LHA 70	LHA 110
Stückleistung in d. Min.	500	400	350
Drahtstärke ca mm	1—2,2	1,8—3,1	2,2—3,8
Länge der Stifte ca mm	10—50	15—70	13—110
Kraftbedarf PS	1	3	4
Drehzahl der Riemenscheibe U/min	500	400	350
Nettogewicht kg	450	800	1400

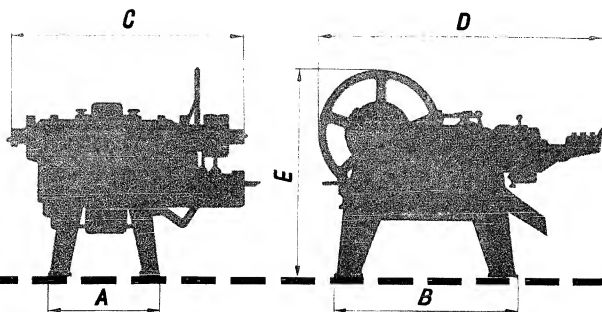
Höhe, Breite, Länge der

Maschine ca mm	1035 x 1070 x 1210	1100 x 1400 x 1600	1160 x 1620 x 2120
Kistenmaße ca mm	1230 x 1270 x 1220	1300 x 1600 x 1600	1400 x 1900 x 2200

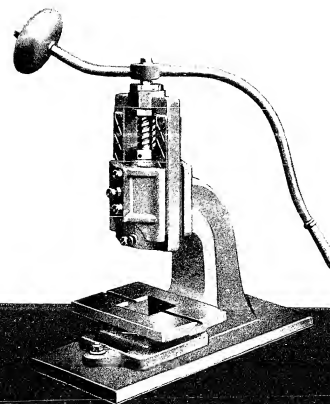
BEI BESTELLUNG BITTEN WIR, DIE BETRIEBSSPANNUNG FÜR DEN ELEKTROMOTOR ANZUGEBEN.

Alle Angaben entsprechen der Maschinenkonstruktion zur Zeit der Drucklegung dieses Prospektes. Durch den jeweiligen Entwicklungsstand bedingte Konstruktionsänderungen bleiben vorbehalten.

	A	B	C	D	E
LHA 50	340	640	1070	1210	1035
LHA 70	440	850	1380	1560	1085
LHA 110	700	1220	1620	2120	1160

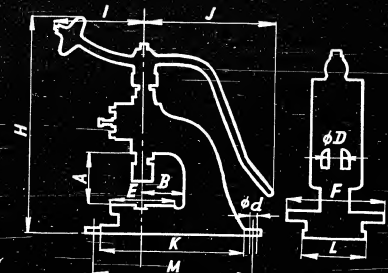


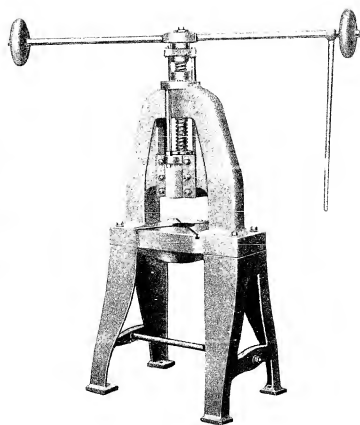
STROJEXPORT - PRAHA - TSCHESCHOSLOWAKEI



STAT

LV40





HAND-OPERATED STRAIGHT-SIDED SCREW PRESSES

LTD

The wide distance between the heavily dimensioned columns and precision workmanship ensure versatility of the machine which may be used for a large scope of pressing operations. The screw is made of high-quality steel and is provided with a triple square thread.

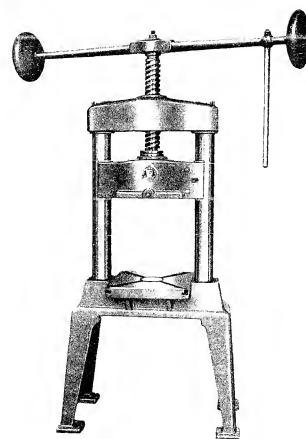
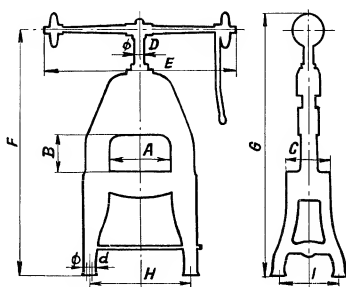
STANDARD EQUIPMENT:

1 insert into the cable drop-hole, 4 clamping upsets with bolts, 1 set of spanners.

SPECIFICATIONS:

Model	LTD 50	LTD 63	LTD 80
Diameter of screw mm	50	65	80
Maximum pressure kg	10,000	16,000	24,000
Dimensions of table mm	235 x 350	300 x 360	330 x 430
Distance between ram-ways mm	165	180	180
Distance between columns mm	350	360	430
Distance, ram-ways to cable mm	140	170	180
Max. distance, cable to ram mm	250	265	300
Stroke of ram mm	180	190	280
Diameter of drop-hole in cable mm	145/110	145/110	180/130
Opening in ram for tool shank mm	25 x 50	25 x 50	32 x 60
Weight of machine kg	340	520	700

	A	B	C	D	E	F	G	H	I	d
LTD 50	350	140	235	50	1100	1610	1695	600	400	21
LTD 63	360	170	300	63	1350	1670	1770	640	420	21
LTD 80	450	180	330	80	1600	1820	1955	790	420	21



HAND-OPERATED

STRAIGHT-SIDED PILLAR SCREW PRESSES SERIES

LVS

These machines are suitable for all pressing, cutting and stamping operations as well as for the inserting of bruses. The brace member and the ram are made of electric steel. The nut for guiding the screw is hydraulically pressed into the brace member. The screw with a triple square thread is forged from a special high-quality steel. The ram-ways are accurately adjustable.

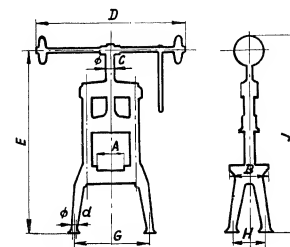
STANDARD EQUIPMENT:

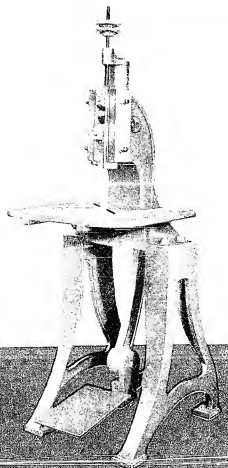
1 insert into the cable drop-hole, 4 clamping upsets with bolts, 1 set of spanners.

SPECIFICATIONS:

Model	LVS 80	LVS 100
Diameter of screw mm	80	100
Maximum pressure kg	24,000	40,000
Distance between columns mm	425	530
Max. distance, cable to ram mm	480	600
Stroke of ram mm	280	350
Dimensions of table mm	400 x 450	450 x 500
Diameter of drop-hole in cable mm	110/75	110-75
Opening in ram for tool shank:		
diameter mm	25	25
depth mm	50	50
Weight of machine kg	700	1200

	A	B	C	D	E	G	H	J	d
LVS 80	400	450	80	1600	1955	725	360	2090	21
LVS 100	500	450	100	2000	2310	870	470	2460	21





FOOT-OPERATED PENDULUM PRESSES SERIES

NKL

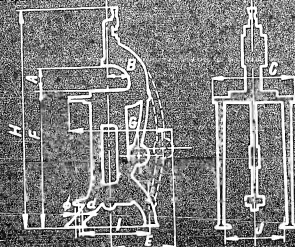
These machines are intended for a wide variety of high bending and casting operations both in mass and in small production. The pendulum stroke is 180 degrees. Also the way in the cast may be accurately regulated. The lever transmission is easily changed and the pedal can be set in the most convenient position for the operator.

STANDARD EQUIPMENT:

1) Foot-operable drive belt, 2) Drawing plate with base, 3) Set of patterns.

SPECIFICATIONS

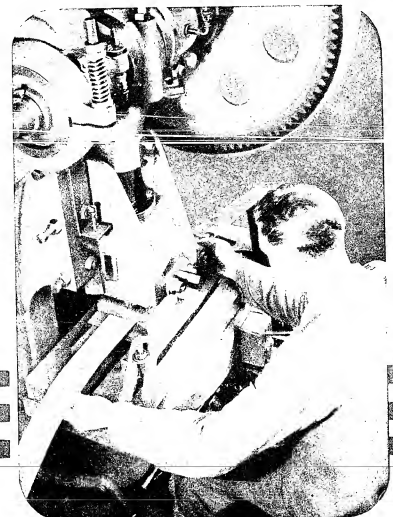
Model	NKL-02	NKL-0
Maximum pressure working	1500	2500
Stroke, mm	125	85
Dimensions of base	350 x 500	240 x 200
Maximum bending angle from vertical	180	180
Maximum distance table to wall	100	100



STROJEXPORT

Mechanical

PRESSES



MECHANICAL PRESSES

We are placing in your hands a catalogue of the most common types of mechanical presses produced in our works. The booklet does not contain special purpose types supplied on special order. All presses are carefully designed, and made of high-quality material in order to meet all demands of the modern technology.

All power-driven presses are fitted with protective devices. These eliminate, under normal circumstances, any injury to the operator. The outstanding quality of our machines is testified not only by the numerous machines already supplied, but also by the large number of orders we are continually receiving both from new and old customers.

Our engineering staff will gladly assist you in the selection of a suitable type of machine, and in solving your manufacturing problems which due to the lack of scientific knowledge on the subject of the technology of shaping metals on presses can only be solved on the basis of experience. In the following you will find the characteristic features of our presses. Where the illustration does not show clearly enough what purpose the press is intended for, a short explanation is stated. At the end a brief survey of auxiliary attachments is given which largely contribute to an increased output and improved quality of products.

Hand-Operated Presses

Gap Frame Presses,
Straight-Sided Presses,
Two-Column,
Foot-Operated Presses,

Eccentric Presses
High-Speed Gap Frame Presses

Gap Frame Presses with
Geared Countershaft

Gap Frame Presses with
Adjustable Table

Gap Frame Straight-Sided
Presses

Gap Frame Straight-Sided
Inclinable Presses

Straight-Sided Crank Presses

Drawing Presses
Inclinable Drawing Presses

Straight-Sided Drawing Presses

Drawing Wheel Presses

Press Brakes

Straight-Sided Friction
Screw Presses
Automatic Grip, Roller and
Pincer Feed Attachment

Turntables

Other Attachments

pressure 5 — 16 tons.

pressure 10 — 24 tons.

pressure 25 to 40 tons, with long ram stroke.

a substitute for small power presses, pressure 1500 to 2500 tons, suitable for finishing work.

Pressure 1.5 to 32 tons.

Suitable for all pressing operations.

Pressure 32 to 50 tons.

Suitable for pressing from strips, not suitable, however, for operations, where the work has to be inserted into the die individually.

Pressure 20 to 315 tons.

Suitable for all operations, where either strip material is used or the workpieces are inserted into the die individually.

Pressure 12 to 80 tons

are supplied either as high-speed presses or with geared countershaft. These machines are used to advantage for operations, where dies of different heights are to be used owing to the size of workpieces; the frame of most types of presses can be fitted with a sturdy steel horn if the table is swung out of the way so that the machine can be used for pressing, drawing and large objects.

Pressure 12.5 to 100 tons

are supplied as high speed presses or with geared countershaft. Suitable for same operations as ordinary gap frame presses; certain customers prefer them to ordinary gap frame presses, because the eccentric shaft has sturdy bearings on either side of the eccentric; they may also be fitted with a turntable.

Pressure 12.5 to 100 tons

are suitable for same operations as above mentioned machines; moreover they have the advantage that the pressings can slide down the table into the space behind the machine immediately after they have left the tool.

Pressure 200 to 500 tons

are designed for heavy shearing, bending, drawing and punching operations. Pressure 8 to 25 tons

double-acting, for deep drawing, with cam-driven downholder, and fine adjustment of table. On this press a disc may be cut and drawn by a single stroke.

Pressure 35 to 45 tons

are of same description as inclinable drawing presses, except for frame which is not inclinable.

Pressure 30 to 125 tons

are designed for making deep vessels.

Pressure 50 to 200 tons

are of welded construction and may be used for bending, shearing, piercing operations etc.

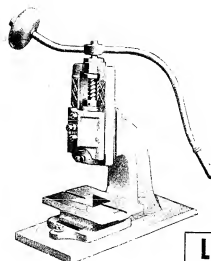
Pressure 25 to 1000 tons.

may be supplied for presses with stationary table up to a pressure of 100 tons. These feed attachments can be supplemented by coilstands and material straightening devices.

can be supplied for straight sided presses series LEP and LEN provided their pressure does not exceed 65 tons.

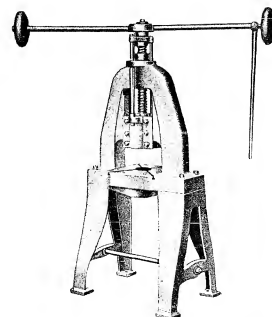
such as drawing, spring- and air-operated devices, bottom or top ejectors, stroke-counters, central lubrication etc. can be supplied to all our presses.

HAND-OPERATED PRESSES



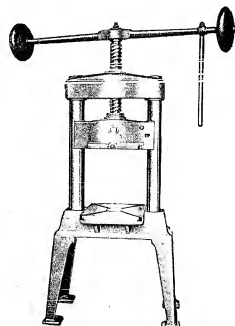
LV 40

Gap Frame Hand-Operated Press
- Pressure 5.000 kg



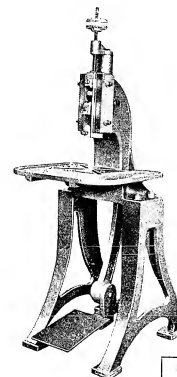
LTD 65

Straight-Sided Hand-Operated Press
- Pressure 16.000 kg



LVS 80

Straight-Sided Column-Type Press
- Pressure 24.000 kg



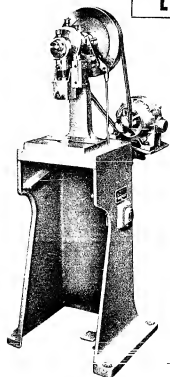
NKL 0

Foot-Operated Press - Pressure 1.500 kg

ECCENTRIC PRESSES

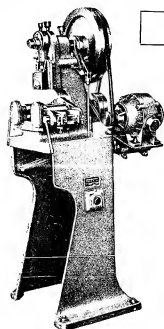
Gap Frame Eccentric Press - Pressure 1500 kg

LBv

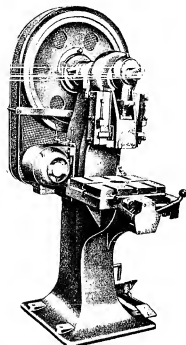


Gap Frame Eccentric Press with Two-Side Roll Feed Attachment - Pressure 2000 kg

LC



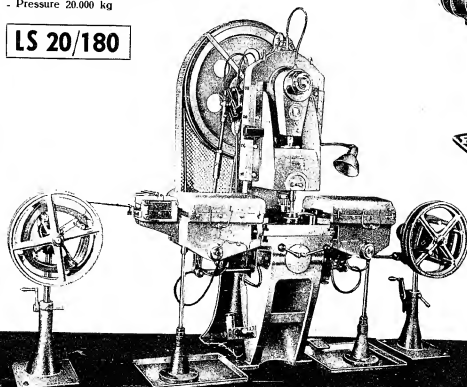
Gap Frame Eccentric Press - Pressure 12500 kg



EE 12.5/16

Gap Frame Eccentric Press with Two-Side Gripper Feed Attachment and with Coil-Stand - Pressure 20.000 kg

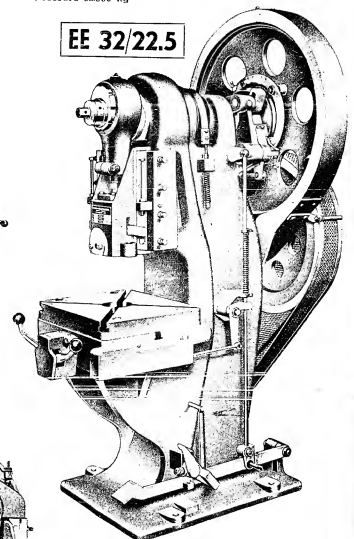
LS 20/180



ECCENTRIC PRESSES

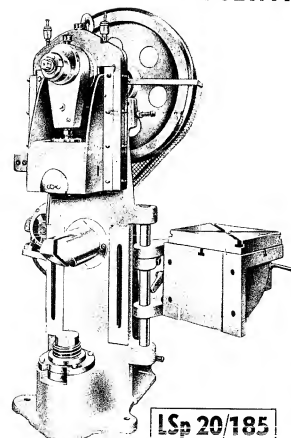
Gap Frame Eccentric Press with Countershaft - Pressure 32.000 kg

EE 32/22.5



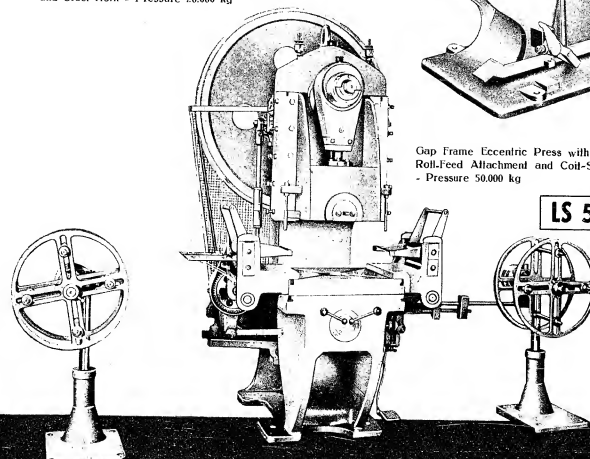
LSp 20/185

Gap Frame Eccentric Press with Swivelling Table and Steel Horn - Pressure 20.000 kg

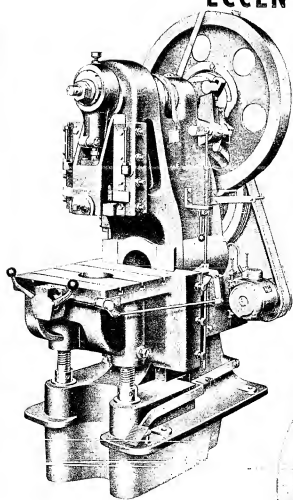


Gap Frame Eccentric Press with Two-Side Roll-Feed Attachment and Coil-Stand - Pressure 50.000 kg

LS 50/280

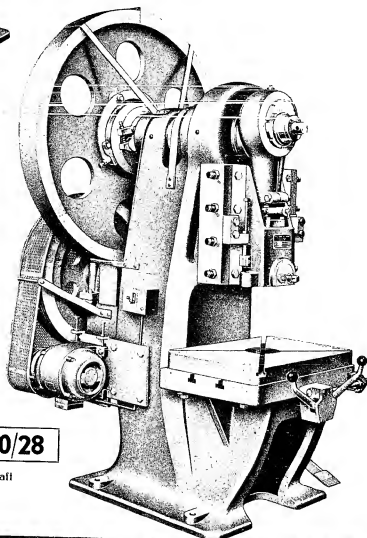


ECENTRIC PRESSES



EEVV 50/35.5

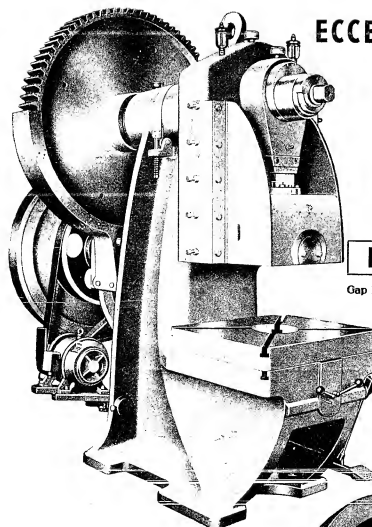
Gap Frame Eccentric Press with Adjustable Table
- Pressure 50.000 kg



EE 80/28

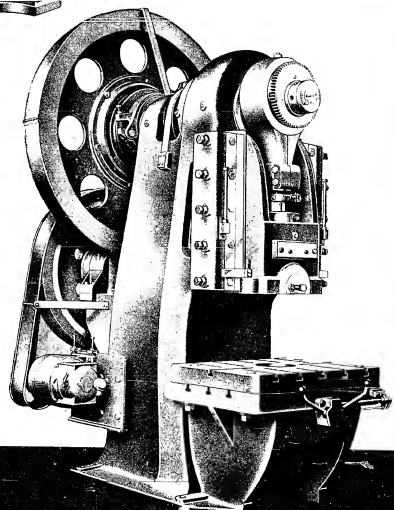
Gap Frame Eccentric Press with Countershaft
- Pressure 80.000 kg

ECENTRIC PRESSES



LP 125/355

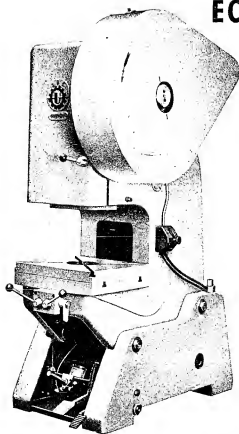
Gap Frame Eccentric Press - Pressure 125.000 kg



EE 200/45

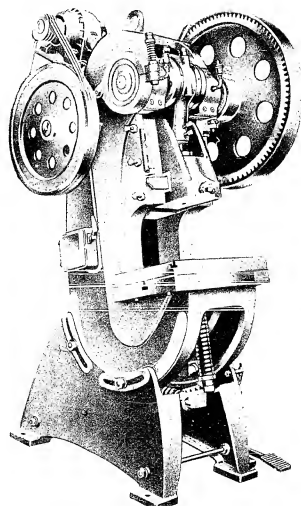
Gap Frame Eccentric Press - Pressure 200.000 kg

ECCENTRIC PRESSES



LEN 32a

Inclinable Eccentric Press - Pressure 32,000 kg

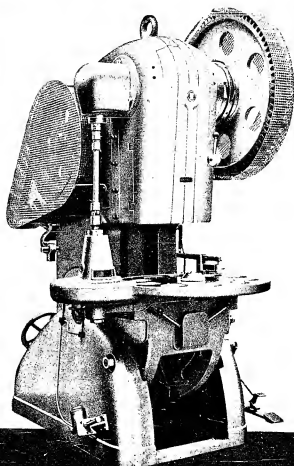


NEZ 7

Inclinable Eccentric Press with Countershaft, Two-Side Roll Feed Attachment and Pneumatic Downholder - Pressure 50,000 kg

LEN 63

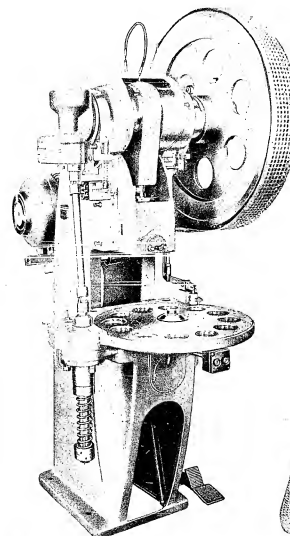
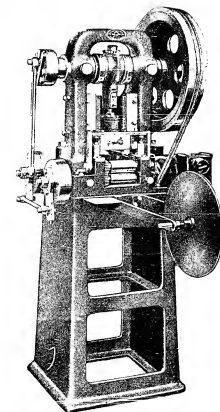
Inclinable Eccentric Press with Revolving Table - Pressure 63,000 kg



ECCENTRIC PRESSES

EL 2

Straight-Sided Eccentric Press with Two-Side Roll Feed Attachment and Coil-Stand - Pressure 8,000 kg

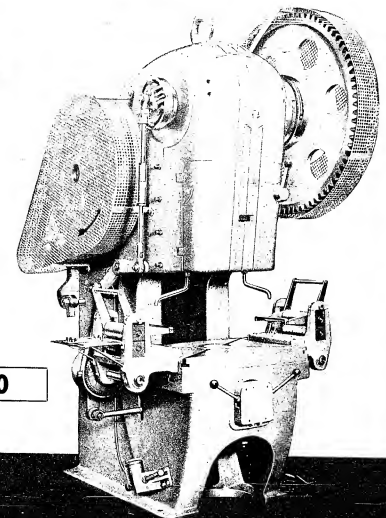


LEP 12.5/140a

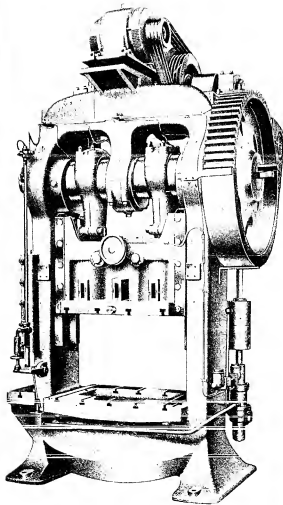
Straight-Sided Eccentric Press with Revolving Table - Pressure 12,500 kg

LEP 63/280

Straight-Sided Eccentric Press with Two-Side Roll Feed Attachment - Pressure 63,000 kg

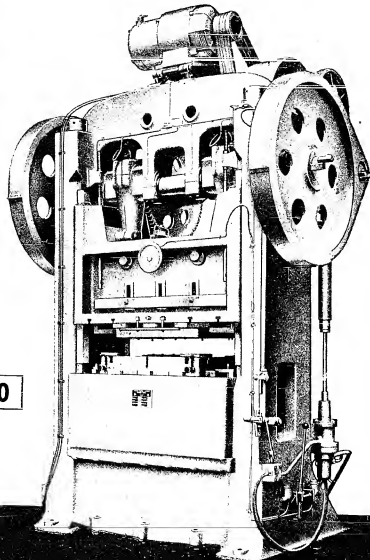


CRANK PRESSES



LKD 315/125

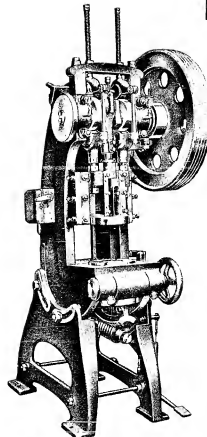
Straight-Sided Crank Press with Simple Countershaft - Pressure 315,000 kg



LKT 200/160

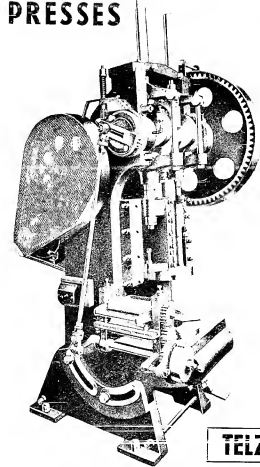
Straight-Sided Crank Press with Double Countershaft - Pressure 200,000 kg

DRAWING PRESSES



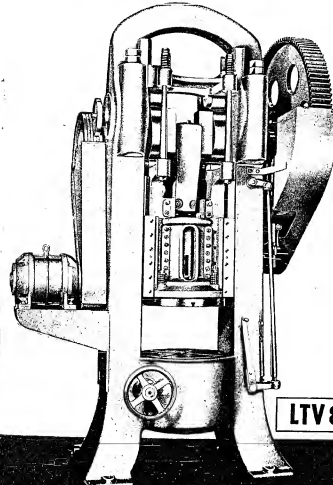
TEL 2

Straight-Sided Inclined Drawing Press with - Pressure 8,000 kg

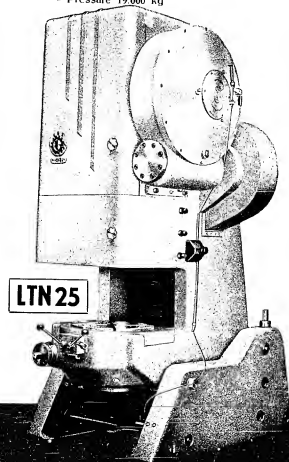


TELZ 5

Straight-Sided Inclined Drawing Press with One-Side Roll Feed Attachment - Pressure 19,000 kg

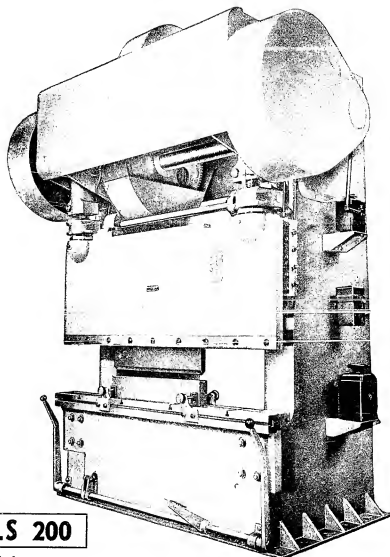


LTV 8



LTN 25

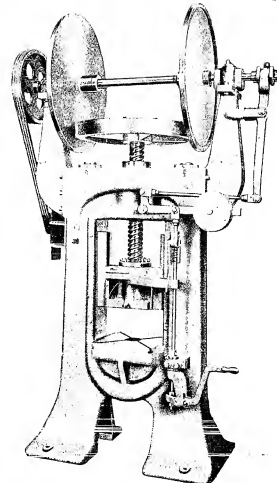
PRESS BRAKES



OLS 200

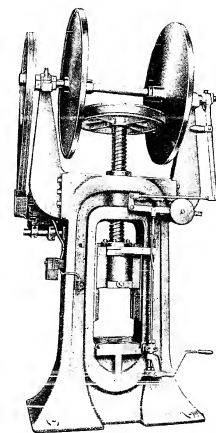
Press Brake

FRICTION SCREW PRESSES



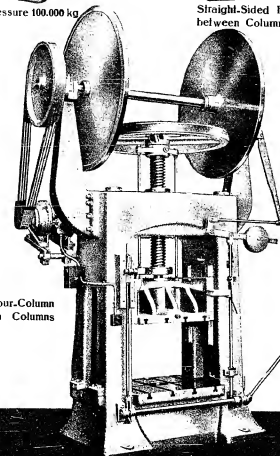
Straight-Sided Friction Press - Pressure 100,000 kg

LF 125/560



Straight-Sided Forging Press, Small Distance between Columns - Pressure 80,000 kg

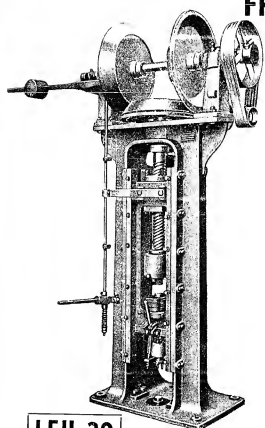
LFK 125/400



Straight-Sided Forging Press, Four-Column Design, Wide Distance between Columns - Pressure 80,000 kg

LFS 125/800

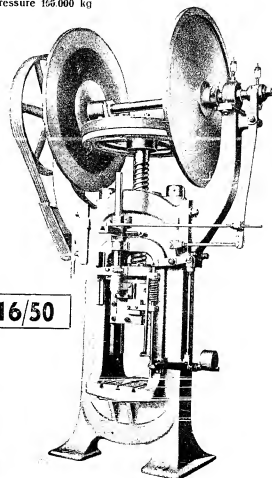
FRICION SCREW PRESSES



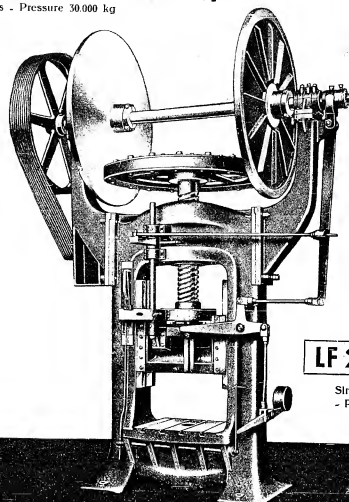
LFH 30

Straight-Sided Friction Screw Press for Making Screws - Pressure 30.000 kg

Straight-Sided Friction Screw Press
- Pressure 150.000 kg



LF 16/50

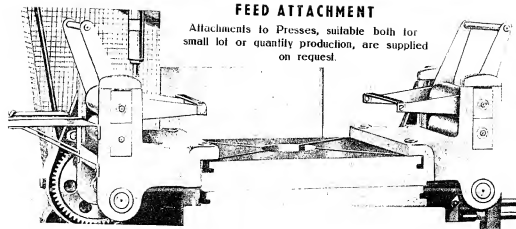


LF 25/118

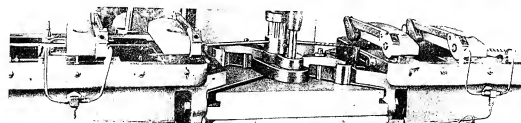
Straight-Sided Friction Screw Press
- Pressure 450.000 kg

FEED ATTACHMENT

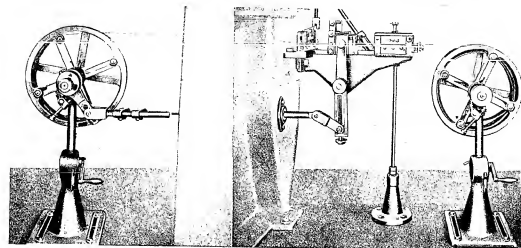
Attachments to Presses, suitable both for small lot or quantity production, are supplied on request.



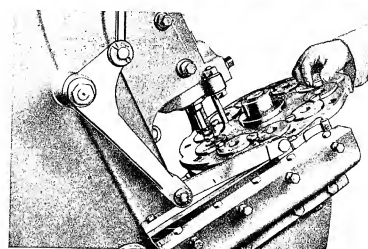
Two-side roll feed attachment



Two-side gripper feed attachment



Double roll feed attachment



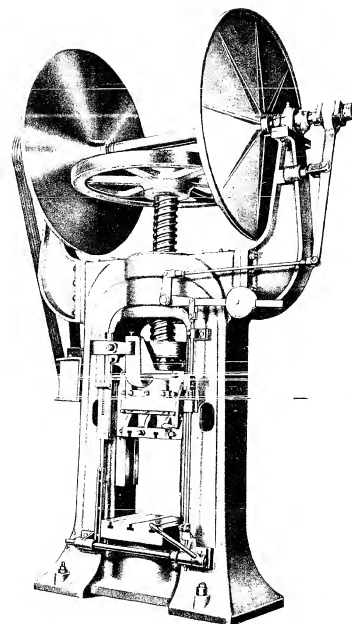
Turnable feed attachment for inclinable eccentric press

KOVO

VÁCLAVSKÉ NÁM. 56, PRAHA II.
CZECHOSLOVAKIA

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.



FRICITION SCREW FORGING PRESS Model LFK 200

This machine has been designed for heavy work in hot forging dies.

The press frame is a rigid one-piece casting made of electrosteel and joined by two rolled steel bolts to eliminate press breakage due to overloading. The hard shocks are absorbed by the elasticity of the cast steel frame which is reinforced by heavily dimensioned hot drawn bolts.

The machine is equipped with a band brake which stops the ram in any position. The brake disc is keyed on the spindle and its braking action may be controlled by a special advance key which is actuated by the operating lever. The brake band is mounted to the ram.

STANDARD EQUIPMENT: 1 insert into the drop-hole, motor, spanners, set of V-belts, 1 operating instructions.

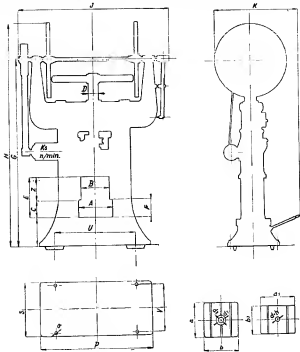
OPTIONAL EQUIPMENT: Electric starting attachment with cables, bottom ejector.

SPECIFICATIONS

Diameter of spindle	mm	200
Max. pressure in case of smallest working travel	kg	250,000
Min. permissible working travel	mm	8
Space under the guide	mm	600
Distance between the guides	mm	500
Distance between table and guides	mm	240
Max. distance between table and ram	mm	700
Surface of table, width \times depth	mm	700 \times 570
Stroke of ram	mm	400
Opening for tool shank (diameter \times depth)	mm	75 \times 110
Number of strokes utilized per minute approx.		25
Diameter of pulley	mm	575
Speed of pulley	r.p.m.	210
Power consumption for direct motor drive	HP	20
Speed of motor	r.p.m.	950
Weight of machine	kg	10 500

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

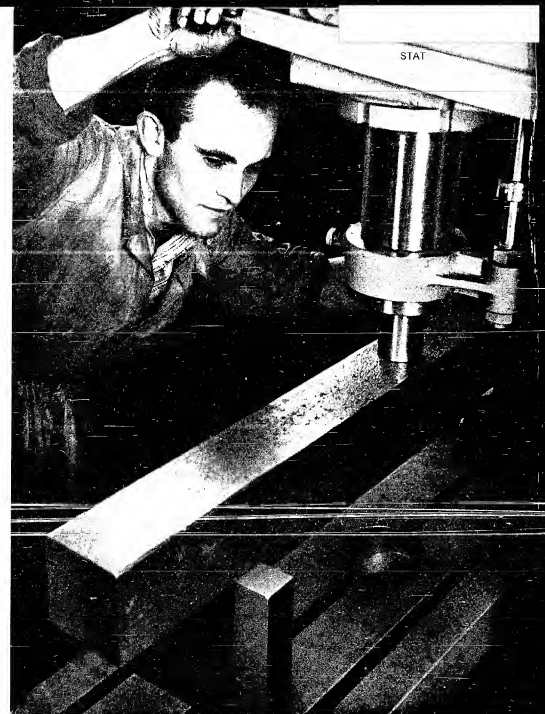
As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.



D	A	B	C	Z	E	F	G	H	J	K	U	V	P	S	a	b	at	br	d	h	di	ds	Ks	n	o
200	600	500	200	400	700	240	3440	4265	2790	2050	1265	740	1790	870	570	700	450	390	75	110	260	140	20	950	43

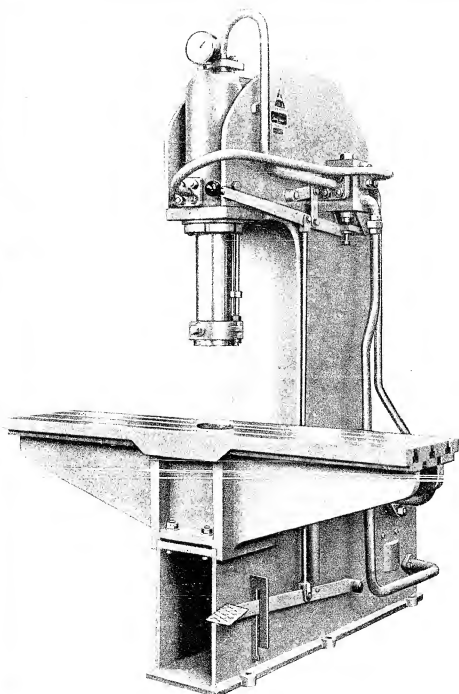
KOVO

PRAHA - CZECHOSLOVAKIA



LD 30

HYDRAULIC STRAIGHTENING PRESS MODEL LD 30



**HYDRAULIC
STRAIGHTENING
PRESS
MODEL LD 30**

This is a heavy duty, fast operating machine. Its versatility, accuracy, ease of handling and overall economy make it ideal for a wide variety of cold bending and straightening operations, for inserting or removing connecting rod bushes, driving box brasses etc. It may also be used for holding down the work in bending and is especially useful for railroad shops and automobile works.

GENERAL DESCRIPTION :

The frame is of substantial cross-beam construction, with electrically welded steel plates, and is accessible from three sides. The power unit is located at the rear of the frame while the hydraulic distributor is at the upper right.

The hydraulic cylinder is made of cast iron and mounted between steel plates at the top of the machine.

The pressing piston is of the differential type with an accurately ground steel piston rod and a grey cast iron head. The head is packed with metal piston rings and the piston rod with a leather cuff. The piston stroke can be read on the scale of the guiding bar. At the bottom the piston is provided with a 35 mm dia. hole for clamping the tool.

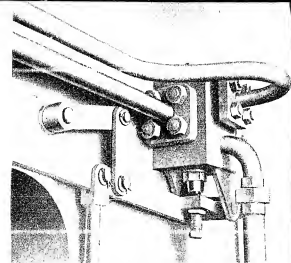
The working table which is made of high quality cast steel, is heavily dimensioned and provided with T-slots and a 120 mm dia. drop-hole.

The control of the press is effected by a hand lever or by a foot treadle which are located on the right-hand side of the press and actuate the single-valve distributor. The valve and the guide rod, made of hardened steel and housed in a steel block, are easily removable. The down and upward stroke of the piston is limited by adjustable stops mounted on a bar which is firmly coupled to the piston.

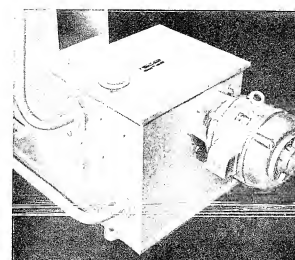
The drive of the press is by a RPZ 2 double-pressure power unit incorporated in the oil tank which is located at the rear of the press frame. The power unit is driven by a flange motor. The low-pressure part consists of a gear pump supplying a large quantity of low-pressure oil for the quick idle motion of the piston. The pressing operation is by high-pressure oil supplied by a plunger pump. The oil pressure is infinitely variable and may be checked up on the pressure gauge even during the operation. The power unit is fitted with a hydraulic cut-out device by which it is automatically released, after the pre-set pressure has been reached, so that the motor runs idle. By this arrangement 50-70 % of driving power are saved.

STANDARD ACCESSORIES:

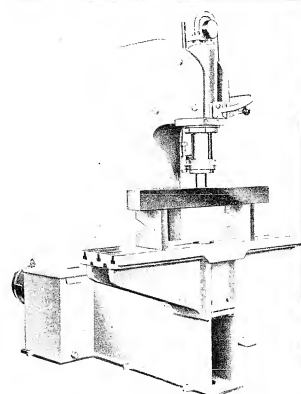
RPZ 2 power unit with motor, pressure gauge, 1 set of spanners, 3 sets of spare packings, 1 operator's instruction booklet.



DISTRIBUTOR



RPZ 2 POWER UNIT

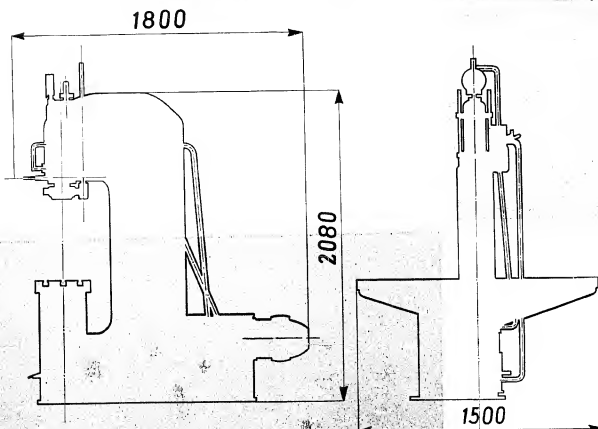


SPECIFICATIONS:

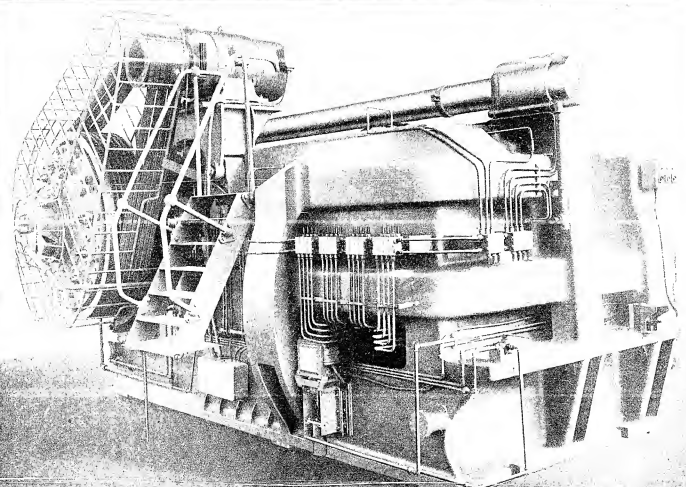
Maximum pressure	tons	30	66,000 lbs
Return pressure	tons	5.7	12,600 lbs
Maximum distance between platens	mm	500	19.7"
Maximum stroke of piston	mm	250	9.8"
Diameter of piston	mm	125/115	4.92"/4.63"
Throat	mm	300	11.8"
Dimensions of table	mm	1500x350	59.1"x13.78"
Drop-hole in table	mm	120	dia. 4.72"
Piston speed for down stroke by low pressure	mm/sec	65	2.56 in. per sec.
Piston speed for down stroke by high pressure	mm/sec	4.5	0.177 in. per sec.
Return speed of piston	mm/sec	250	9.8 in. per sec.
Capacity of power unit RPZ 2:			
Gear pump supplies 45 litres (10 galls) per minute up to	at	12	170 lbs per sq. inch
Plunger pump supplies 2.7 litres (0.6 galls) per minute up to	at	300	4250 lbs per sq. inch
Output of motor	kW	1.5	
Dimensions of machine (length x width x height)	cm	180x150x208	71"x59"x82"
Dimensions of seaworthy packing (length x width x height)	cm	190x94x202	75"x37"x89"
Net weight of machine	kg	1050	2,320 lbs
Weight of machine with packing	kg	1300	2,860 lbs
Weight of machine with seaworthy packing	kg	1410	3,100 lbs

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY!

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.



KOVO LTD., 56, VÁCLAVSKÉ NÁM., PRAHA II, CZECHOSLOVAKIA



HORIZONTAL FORGING PRESS TYPE **GKM 800**

The machine is designed and built for heavy forging operations and its outstanding features are high output and reliability in service.

The stand of the press is a steel casting the rigidity of which is increased by two anchors shrunk onto it. There are two rams moving on the guideways of the stand. They are driven by a crankshaft which runs in bronze bushes. The movement is transmitted to the main ram, which has extended guideways, by a forged connecting rod actuated by an eccentric crankpin. The clamping ram is driven by two cams and a bell crank mechanism. The main ram is provided with a wedge which serves for positioning a part of the forging tool.

The crankshaft is driven by a simple reduction gear. The pinion keyed to the layshaft is driven through a multi-plate clutch by a flywheel to which the torque of the electric motor is transmitted by V-belts. The rotating masses are stopped, when the clutch is disengaged, by an automatically acting band brake fitted to the layshaft.

The press is controlled by compressed air which is distributed by a slide valve. It is started by foot. The press is centrally lubricated. The lubricant is supplied by a hand pump. The distribution of lubricant to the various lubricating points is governed by distributors.

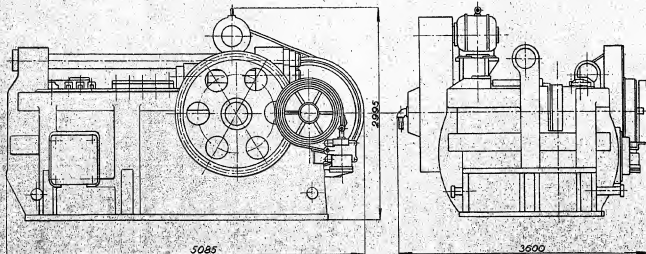
The press is protected against overload by a safety device set for the required pressure hydraulically. The safety device is fitted between the layshaft and the pinion. There is, in addition, a spring operated safety device in the bell crank mechanism of the clamping ram.

Included in the equipment of the press is an adjustable stop for limiting the length of the rod fed into the machine for forging and the distribution of coolant to the dies.

SPECIFICATION

Permissible pressure of press	800 tons
Maximum diameter of soft steel rod to be forged	100 mm 4"
Stroke of main ram	380 mm 15"
Number of strokes	35 per min.
Working stroke of main ram	250 mm 9 ¹¹ / ₃₂ "
Return stroke of main ram with dies closed	125 mm 4 ²⁹ / ₃₂ "
Stroke of clamping ram	159 mm 6 ¹¹ / ₃₂ "
Dimensions of die: length	550 mm 21 ¹³ / ₃₂ "
width	210 mm 8 ¹¹ / ₃₂ "
height	660 mm 26"
Output of electric motor	35 kW
Speed of electric motor	730 r.p.m.
Weight approximately	78 tons

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY.



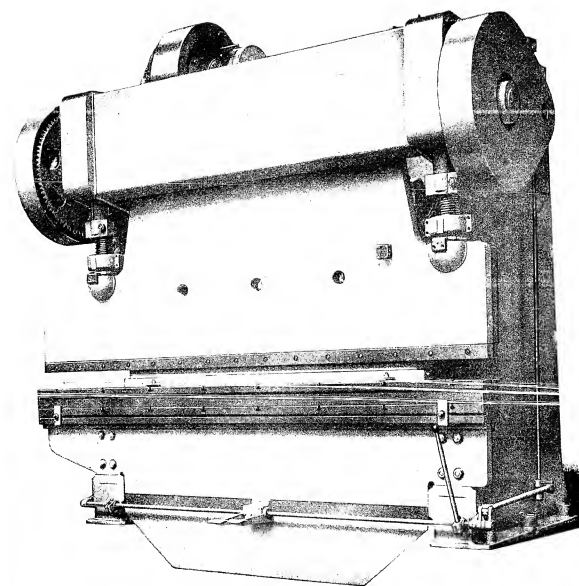
As our machines are continually being changed, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

STROJEXPORT PRAHA-CZECHOSLOVAKIA

ODK 520112 a - 5311

Printed in Czechoslovakia

STAT



PRESS BRAKES MODEL **OLS 200**

PRESS BRAKES MODEL OLS 200

These straight-sided press brakes constructed of solid high-strength steel plates are modern machines for bending, forming or multiple punching of sheet metal and steel plates.

The electrically welded housings form a hollow frame the correctly engineered construction of which is a guarantee against breakage and against deflection of bed and ram. Thus dependability in service is ensured. The housings are interconnected by hollow braces made of welded steel plates. The braces are mounted so as to make the machine easily accessible also from the rear.

The ram and the table are integral parts made from one heavy steel plate. The accurately finished table surface is provided with T-slots for clamping the dies, channel dies, fixtures, die holders, etc. The ram has guiding gibs which are adjustable to ensure its accurate action. Eccentrics forged from high-quality steel are running in bronze lined bearings. The pressing power is transmitted from the eccentrics by cast steel connecting rods with ball and sockets knuckle from quality steel.

The gears of the eccentric shaft are accurately hobbled for long life and quiet running. The power is transmitted from an electric slip ring motor which drives the flywheel by V-belts. The flywheel shaft and the flywheel rotate in self-aligning roller bearings. On the flywheel shaft also a brake clutch of the multiple disc type is mounted which starts and stops the machine in any position of the ram.

The machine is operated either by a hand lever or by a foot treadle which are fitted in front of the work table. The machine can be provided with an air-operated servomotor or an electric controlling device, if desired.

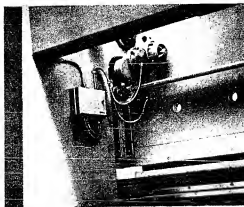
The ram adjustment is made with an individual motor and relays by depressing a pushbutton. On the shaft of the ram adjusting motor a safety clutch of the multiple disc type against overload is mounted which also secures the reversion of rotation from right to left. The play in the knuckle joint of the connecting rod and of the bronze bush is eliminated by an adjusting nut.

The machine has central lubrication system by a lubricating device driven from the countershaft. Each oil distributor and oiling point has its special sight window to ensure a thorough lubrication of the entire machine mechanism. The roller and auxiliary bearings are grease lubricated by means of a grease gun.

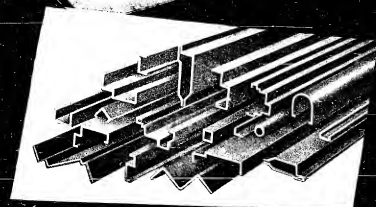
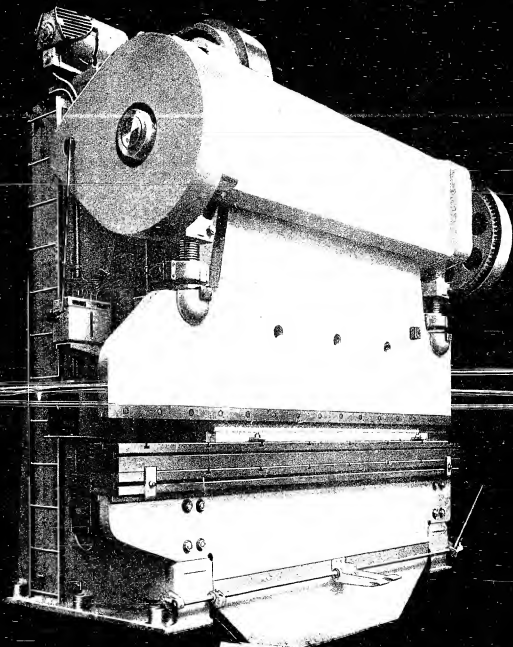
The electrical equipment is of first class quality to meet the rules and requirements. The main drive motor, V-belts, top bearings and the driving mechanism are easily accessible from the ladder on the left-hand side housing of the machine.

The machine is supplied ready for service, with electrical equipment, spanners, grease gun, operating instruction booklet, etc.

OPTIONAL EQUIPMENT: Stops, clamps of the bottom die, various detachable cutting tools.

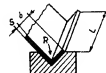


MOTOR-DRIVEN RAM ADJUSTMENT



SPECIFICATIONS:

Model: Old designation	OLS 200/a	OLS 200/b	OLS 200/c
New designation	LO 200-A	LO 200-B	LO 200-C
Maximum working pressure	kg	200 000	4250
Maximum working length	mm	3750	4250
Distance between housings	mm	2600	3550
Forming capacity 45 kg/mm ² for L	1500 2000 2500 3000 3600 4200		
up to s	4 5 7 9 11 13		
Specification of minimum values	s 5 6 8 10 12 14	6 8 11 13 16 20	11 13 16 20 24 28
for the selection of the tool (in mm)	s 6 8 10 12 14	13 20 27 34 42 50	42 50 58 68 80 98
	s 12 14	22 34 44 55 65 80 98	—
	s 14	50 70 90 110	—



Depth of throat	mm	305
Width of table	mm	250
Max. distance, table to ram	mm	450
Adjustment of ram	mm	150
Height of stroke	mm	80
Number of working strokes per minute		22
Output speed of main drive motor	HP/r. p. m.	15 1450
Output speed of ram adjuster motor	HP/r. p. m.	3.0 1150
Maximum plate thickness formed (45 kg/mm ² tensile)	mm	12
Maximum length formed	mm	3050
Overall length of machine	mm	4000
Overall width of machine	mm	2200
Height of machine, height of table above floor	mm	3800 910
Overall height of machine	mm	4200
Net weight of machine	kg	20 000

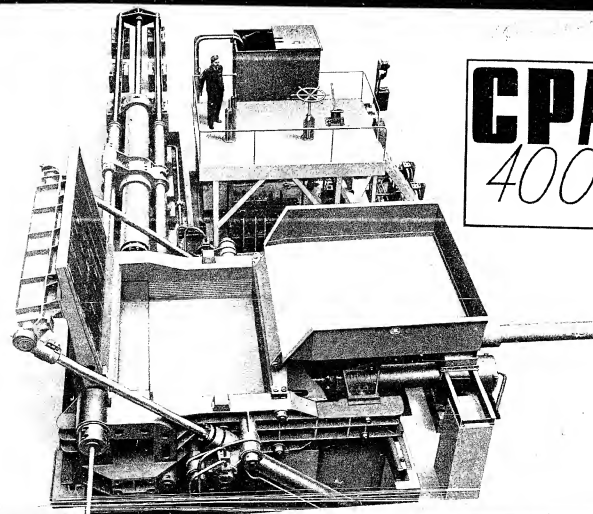
For light bending operations we supply Press Brakes for 125 tons pressure. We will gladly submit you our offer on request. In ordering, specify voltage, phase and frequency of power supply! As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.

For the selection of a Press Brake and for its use the following basic factors are of prime importance:

- Length to be formed
- Plate thickness
- Tensile strength and yield point of plate
- Width of plate (b)
- Radius of bend (R)
- Drawings of the profiles required

These data are also very important for the selection of the lower and upper die as well as of the channel die.

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CPA
400

TYPE CPA 400 HYDRAULIC SCRAP PACKING PRESS

The press is used in heavy engineering plants for packing metal scrap into bales to make them ready for storage, transportation, charging into furnaces, etc.

Description

The press consists of the following parts: hopper, filling box with lid, 2 rough-pressing cylinders and 1 cylinder for the reverse movement of the rough-pressing traverse and the hydraulically controlled locking device of the filling box opening, through which the bale is removed from the box.

1 hydraulic final-pressing cylinder with 2 reverse cylinders for the reverse movement of the final-pressing pusher.

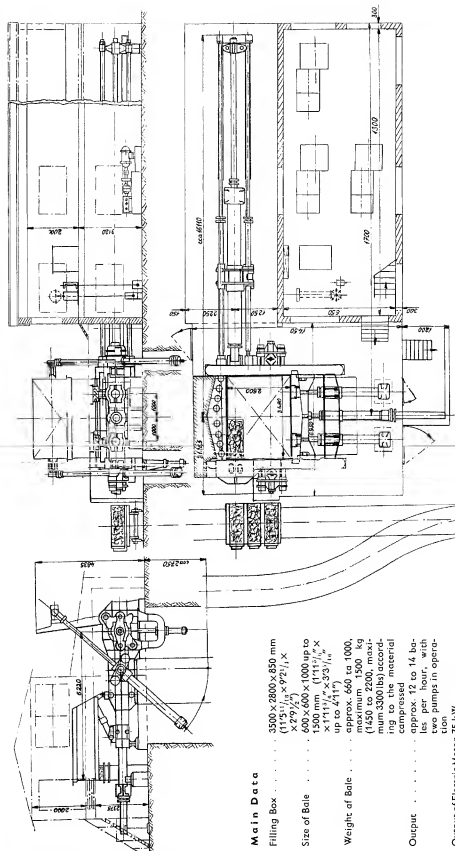
1 central and 1 auxiliary distribution equipment by means of which the press can be stopped in any position during operation, if required.

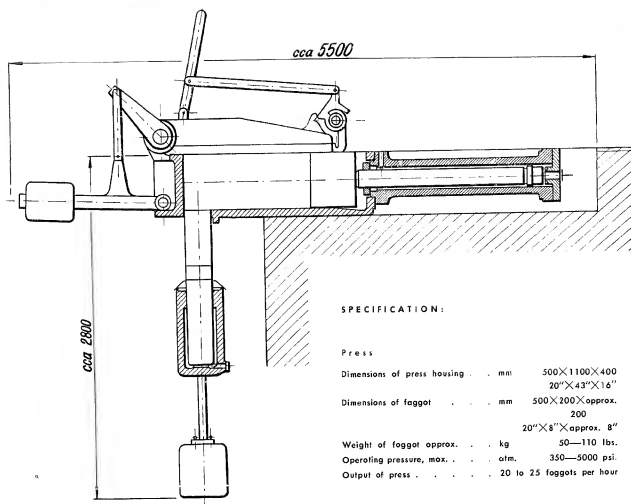
According to the client's wish the press can be supplied with 2 or 3 six-plunger pressure pumps type 39/6 driven by an electric motor of approx. 75 kW output through a gear box of the double pressure type. One of the pumps is intended as a stand-by unit in the event of occasional inspections.

Operation

The hopper of ample dimensions is fed with material, most speedily by an electro-magnetic crane. Its contents is then tilted by means of 2 hydraulic cylinders into the filling box. Next the lid of the filling box is closed by means of two hydraulic cylinders to a layer of 600 mm (1'11 1/2"). Then the material is pressed down by means of the rough-pressing traverse, which is 3500 mm (11'3 1/4") wide to a depth of 600 mm (1'11 1/2"). Finally the final-pressing plunger compresses the material at a right angle to the foregoing compression to a length of bale of 1000 to 1500 mm (3'3 1/4" to 4'11"). After opening the filling box which is effected hydraulically, the final-pressing plunger pushed the bale out of the filling section where it is removed by a crane or by some other means.

The press is equipped with an automatic releasing double-pressure apparatus which disengages the low pressure plungers of the pump when a pressure of 140 atm (9970 psi) is reached, while at a pressure of 300 atm (3940 psi) also the high pressure plungers are disengaged and the pumps run idle.





SPECIFICATION:

Press
 Dimensions of press housing . . . mm 500×1100×400
 20"×43"×16"
 Dimensions of faggot . . . mm 500×200×approx.
 200
 20"×8"×approx. 8"
 Weight of faggot approx. . . kg 50—110 lbs.
 Operating pressure, max. . . atm. 350—5000 psi.
 Output of press . . . 20 to 25 faggots per hour

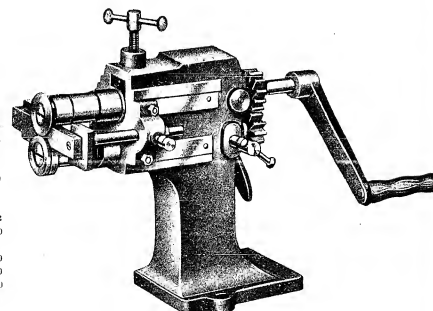
P . . . m.p.
 Output per minute . . . litres 100.4/15.4
 Imp. Coils. 22.13/3.40
 Pressure . . . atm. 64/350
 psi. 910/5000
 Stroke . . . mm 50—1 31/32"
 Diameter of plungers . . . mm 3×55×5 and 3×24
 3×2 5/32"×3/16"
 and 3×15/16"
 Speed . . . r. p. m. 253
 Input on pump shaft, approx. . . HP 21
 Electric motor 380/220 Volts, 50 cycles
 Continuous rating . . . HP 27
 Speed . . . r. p. m. 1430
 Volume of packing box . . . cu. metres — cu. ft.

Please state the operating voltage in your order.
 Changes of details of design reserved.

STROJEXPORT

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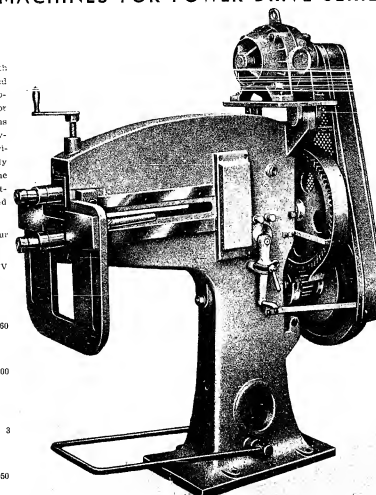
BORDERING MACHINES FOR HAND DRIVE SERIES XB



are particularly well-suited for tinsmith's shops. They may be used for bordering, folding, straightening, bottom tightening, wiring and ornament pressing. The rolls on the last page of this prospectus are supplied as standard equipment. The machines are made in 3 sizes:

	XB	XB	XB
Size	50/120	56/280	50/400
Distance between centres of both rolls	mm 50	56	90
Working depth	mm 100	280	400
Weight	kg 25	60	220

BORDERING MACHINES FOR POWER DRIVE SERIES XBM

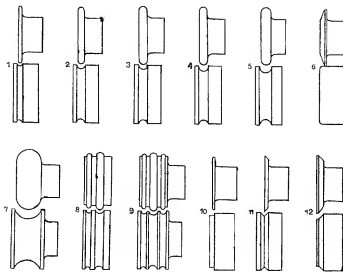


These machines are provided with a motor, a transmission gear and a friction clutch, the latter enabling instantaneous starting or stopping of the machine by means of a foot lever. The shafts carrying the profile rolls are heavily dimensioned and adequately mounted in plain bearings. The bottom shaft is axially adjustable. A circular guide is supplied to special order.

The machines are made in four sizes:

Size	I	III	IV	V
Distance between centres of both rolls	mm 90	120	120	180
Maximum working depth	mm 400	400	700	500
Maximum plate thickness up to	mm 1.5	2	2	3
Net weight of machine approx.	kg 230	345	480	1050
Weight of circular guide approx.	kg 60	95	95	180

THE PROFILES OF ROLLS SUPPLIED AS STANDARD EQUIPMENT



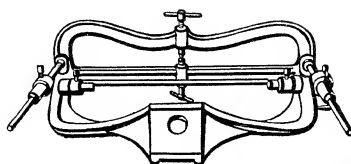
On special order and at an extra charge we supply additional forming rolls as per drawings sent.

THE CIRCULAR GUIDE

As special equipment we supply the circular guide which is particularly used for knurling or ornament pressing of bottoms.

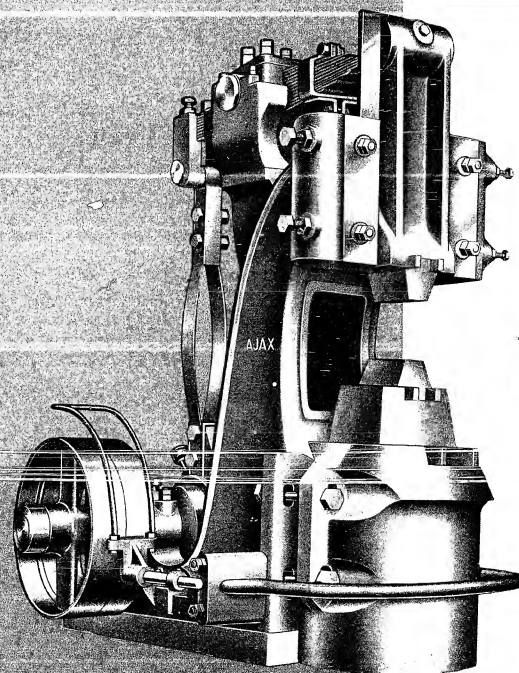
For machine	For bottom diameters
XB 50/150	90-450 mm
XB 56/280	100-700 mm
XBM 80/400	300-700 mm
XBM 120/600	300-700 mm 400-1000 400-1350
XBM 150/700	300-700 mm 400-1000 400-1350
XBM 160/600	300-700 mm 400-1000 400-1350

In ordering, specify voltage, phase and frequency of power supply.
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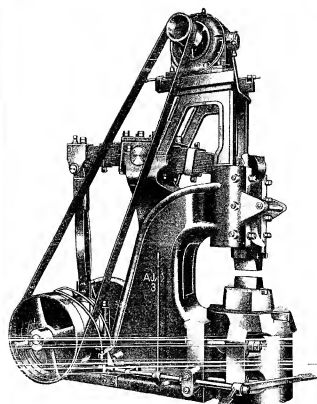
AJAX

SPRING HAMMERS

AJAX

SPRING HAMMERS

GENERAL DESCRIPTION OF THE AJAX LAMINATED SPRING HAMMERS:



Owing to their efficiency of production and simplicity of design the AJAX LAMINATED SPRING HAMMERS belong to the most perfect forging machines of this kind.

Low purchasing costs, ease of operation, versatility, low horsepower requirements and reliability in service are the main features of these machines.

The AJAX HAMMERS are supplied arranged either for the line shaft or individual motor drive.

With this completely new design the opening is closed at the front and forms a lubricating space at the end of the laminated springs.

This feature offers a number of advantages:

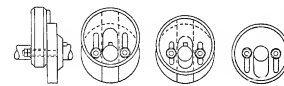
1. The end of the laminated spring is constantly lubricated which reduces the wear to the minimum.
2. The lubricant does not splash and does not disturb the operator.
3. Small chips produced on the springs are collected in the lubricating space whereby the operator is protected from injury.
4. At the entrance the section for the laminated spring is reinforced to eliminate breakage of the ram.

The following results of stretching are a proof of the high capacity of the AJAX HAMMERS:

Hammer No.	Weight of ram kg	Blows per minute	Material forged	Cross section of material	Size of material mm	Forging time min.	Output in stretching
1	40	300	Mild steel	□	40	3	from 200 up to 1100 mm
2	70	290	Mild steel	□	60	3	from 200 up to 1600 mm
3	100	200	Mild steel	□	90	3	from 280 up to 2000 mm
3	100	200	Open-hearth steel	○	90	3	from 280 up to 1600 mm

After 3 minutes of forging the stock was still fairly red hot and at the same heat the stretching was continued.

The AJAX Laminated Spring Hammers are made in 3 sizes with the weight of ram of 40, 70 and 100 kilos. The hammers are arranged for overhead shafting or for individual motor drive. The belt is shifted by belt guide "13" from the fast to the loose pulley. The motion to the belt guide "13" is transmitted from the foot treadle "14" extending around the anvil block "2". The main shaft is supported by bearings mounted on the upright "1" and has on its one end the belt pulley "6" and on the other end the flywheel "8", which ensures a quiet and uniform running. The brake acts on the flywheel "8" after disengaging the foot treadle "14" whereby a weight shifts the belt "15" to the loose pulley. The main shaft carries in the middle the eccentric "7" the stroke of which may be adjusted down to zero to enable the heavy hammers to be used also for light forging operations. A carrier slot in the eccentric relieves the tightening screws of stress.



The double-leave spring "9" transmits the motion from the eccentric to the laminated spring "11" consisting of individual, easily replaceable spring leaves. The other end of the laminated spring carries the cast steel ram "12", which is securely guided in long adjustable gibs. The tightening keys or dies projecting from the ram do not interfere as the ram guide is open at the front and recessed at the rear.

The anvil consists of the anvil block "2", the anvil "3" and the die "4". The anvil block is separate from the frame but is fastened to it by 4 heavy bolts. Thus not only the jolt of the blow is prevented to be transmitted direct to the bed but the anvil block obtains a certain elasticity in the vertical direction. This feature is especially useful when the oak plank timber which is used as a base for the anvil block, dries up and shrinks, then by the elasticity of the anvil block strains in the frame and consequently its breakage is avoided. Any motion of the anvil block in the horizontal direction is quite impossible so that the dies are always in accurate alignment, which is most essential particularly in drop forging.

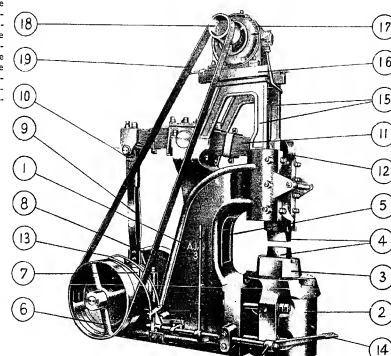
The anvil block, anvil and ram are provided with dovetails for holding the dies which are secured by pins against lateral motion. At the height of the dies the upright is provided with the opening "5" for passing through longer workpieces. If necessary, the sizes No. 1 and 2 are made with the dies arranged vertically to the main shaft while the size No. 3 has the dies in angular position to the shaft. For special forging operations the sizes No. 1, 2 and 3 may be made with a slight extra charge.

HAMMERS WITH INDIVIDUAL MOTOR DRIVE

The motor "17" with a squirrel-cage rotor is mounted at the top of the upright "1" on two brackets "15". The motor base plate "16" enables a easy belt tension adjustment.

The power is transmitted from the motor "17" by the belt "19" in a similar way as from the line shaft. The trough many years of practical service well proven hammer control on the principle of belt shifting has been retained. Starting and stopping of motor is effected by a push button switch on the right-hand side of the frame. A safety switch protecting the motor against overload may be connected to the line in any distance from the machine.

The convenient location of the motor makes the laminated spring "11" readily accessible so that if necessary a spring plate may be easily replaced without removing the motor. The belt drive is provided with wire net protection. The AJAX Hammers arranged for individual motor drive, are supplied completely assembled, including the electric motor of a horsepower corresponding with the size of the hammer. The motor should be selected somewhat more powerful than necessary to ensure reliability in service and long life of the machine as well as of the driving mechanism.



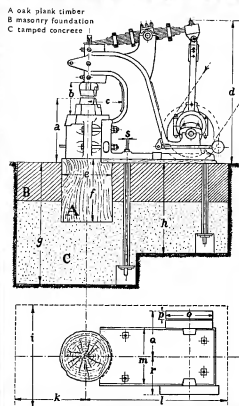
- 1 Upright
- 2 Anvil block
- 3 Anvil
- 4 Dies
- 5 Opening through upright
- 6 Belt pulley
- 7 Eccentric
- 8 Flywheel
- 9 Spring of eccentric
- 10 Joint
- 11 Laminated spring
- 12 Ram
- 13 Belt shifter
- 14 Foot treadle
- 15 Brackets
- 16 Motor base plate
- 17 Motor
- 18 Belt pulley
- 19 Belt

SPECIFICATIONS

Size of hammer	No.	1	2	3
Code word		ADAM	ABEL	ALEX
Weight of ram	kg	40	70	100
Blows per minute		300	225	175
Horsepower required	HP	1-1 1/4	2-3	4-5
Maximum stroke	mm	150	220	280
Size of stock:				
Flat iron, up to the height of	mm	70	100	130
Square iron, up to	mm	40	60	100
Diameter and width of belt-pulley	mm	350 x 65	400 x 100	600 x 110
Length of ram guide	mm	250	400	500
Floor-space required	mm	650 x 1200	800 x 1700	1000 x 2000
Overall height, motor included	mm	1600	2000	2500
Dies: Standard length	mm	125	180	200
Maximum length	mm	175	225	230
Maximum width	mm	150	180	130
Weight of machine:				
for line shaft drive	kg	850	1900	3900
for motor drive	kg	935	1980	4150
Motor: Output	HP	2.5	4	7.5
Speed	r.p.m.	940	710	710
Belt pulley, width x diam.	mm	140 x 120	210 x 140	240 x 170

IN ORDERING, SPECIFY VOLTAGE, PHASE AND FREQUENCY OF POWER SUPPLY

As improvements in design are continually being made, this specification is not to be regarded as binding in detail, and dimensions are subject to alteration without notice.



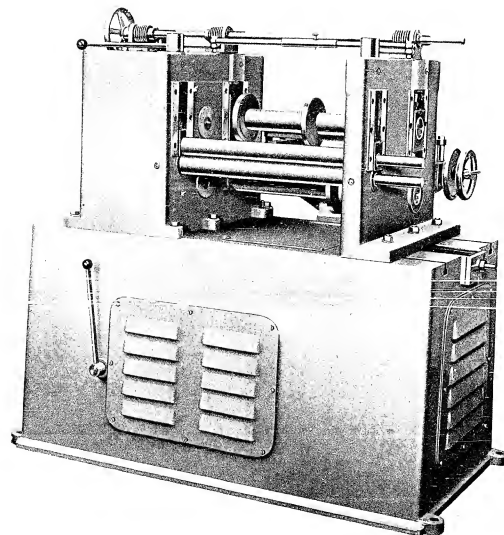
Size

	1	2	3
a	680	750	825
b	320	400	410
c	225	350	450
d	1300	1600	1800
e	400	500	650
f	500	600	800
g	650	1200	1550
h	650	1200	1150
i	700	800	1300
k	350	560	925
l	1000	1500	1800
m	450	600	700
n	300	225	175
o	350	400	600
p	65	100	110
q	325	410	580
r	260	330	480
s	M 20	M 24	M 30

STROJEXPORT

POWER DRIVEN STRIP SHEARS

Types NOP 50/3 and NOP 75/3



The machines are suitable for cutting a strip of sheet metal to two or more narrower strips. The width of the strips being cut is set by inserting spacers of various widths between the knives.

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The machines are driven by an electric motor the power of which is transmitted to the lower knife shaft through a multi-plate clutch and three reducing gears. The upper knife shaft is gear driven. Quick stopping of the machine is facilitated by a brake. The shaft of the third reducing gear is extended and fitted with a sprocket for a roller chain for the drive of a collar. The strip of sheet metal is fed between the knives by means of adjustable bars and drawn out of the cut by passing between two rollers one of which is a driving one.

STANDARD EQUIPMENT:

For Type: NOP 50/3

4 circular knives
126 spacers 2 to 50 mm thick
10 feeding bars, long
5 feeding bars, short
spanners for attendance
hand grease gun
technical documents

For Type: NOP 75/3

4 circular knives
126 spacers 2 to 50 mm thick
spanners for attendance
hand grease gun
technical documents

OPTIONAL EQUIPMENT:

For Type: NOP 50/3

Disc knives to order
Unwinding and coiling equipment

For Type: NOP 75/3

Disc knives to order
Unwinding and coiling equipment

SPECIFICATION:

Type	NOP 50/3		NOP 75/3	
Maximum width of strip . . . mm	500	19 5/8"	mm 750	29 1/2"
Clear width between housings . mm	600	23 5/8"	mm 800	31 1/2"
Maximum thickness of sheets with:				
2 pairs of knives . . . mm	3	11 S.W.G.	mm 3	11 S.W.G.
4 pairs of knives . . . mm	2	14 S.W.G.	mm 2	14 S.W.G.
6 pairs of knives . . . mm	1.5	17 S.W.G.	mm 1.5	17 S.W.G.
10 pairs of knives . . . mm	1	19 S.W.G.	mm 1	19 S.W.G.
12 pairs of knives . . . mm	0.75	22 S.W.G.	mm 0.75	22 S.W.G.
Minimum width of strips cut . mm	15	19/32"	mm 15	19/32"
Cutting speed, per minute . . . metres	20	65' 7"	metres 20.7	39' to 97' 3"
				to 29.6
Power of electric motor . . . kW	5.5		kW 9.5	
Weight of machine . . . kg	2300	5070 lbs	kg 2950	6500 lbs

PLEASE STATE IN YOUR ORDER THE VOLTAGE AVAILABLE FOR THE ELECTRIC MOTORS

The particulars stated in the prospectus are not binding in detail

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